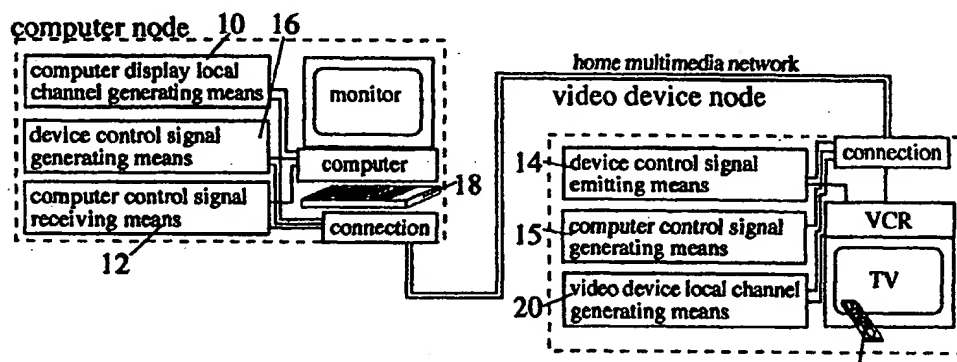




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(54) Title: METHODS AND APPARATUS FOR MULTIMEDIA NETWORKING SYSTEMS



## (57) Abstract

A multimedia network for enabling the viewing of computer-generated data on any television, video and/or audio display connected to a multimedia network, such as a hard wired coaxial television cable network. The multimedia network enables the remote control of a computer via control signals carried over the multimedia network, as well as the remote control of a video device via control signals generated by a computer and carried over the multimedia network, thus enabling the viewing of computer-generated data on any television, video and/or audio display connected to a multimedia network. A method for indicating the content recorded on a video recording medium. The content may include recorded movies, television programs or home video recording. An HTML-type document is created by a computer or microprocessor and recorded on the recording medium. This HTML-type document includes information that pertains to the content recorded on the recording medium. An inventive wireless display terminal receives a video signal originating from a computer, multimedia or other audio and/or video signal generating device and transmitted via RF signals from an antenna node. A controllable, high security, low emission, clear and consistent wireless signal zone anywhere desired within the office or home. Antenna node devices connect with pre-existing wire networks and act as a bridge between wireless devices and the hardwire network. The use of the pre-existing wire network creates an efficient and effective transmission path for connectivity between the antenna node devices and devices connected to the coax. The use of wireless network components creates the opportunity for mobility and avoids the problems associated with installing new wires.

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## METHODS AND APPARATUS FOR MULTIMEDIA NETWORKING SYSTEMS

### BACKGROUND OF THE INVENTION:

The present invention pertains to a multimedia networking system. The present invention also pertains to a wireless display terminal for use with a multimedia networking system. Further, the present invention pertains to antenna node devices for bridging a wired network and wireless devices of a multimedia networking system.

Multimedia networking systems allow the output of a audio, video or computer data signal generating device, such as a computer, VCR, DVD, home stereo, etc. to be available for display through a remotely located display device. For example, the monitor output of a computer located in one room in a home can be transferred via the networking system to a display device, such as a television, located in another room in the home. Control signals generated by a user input device, such as a remote controller or wireless keyboard, are transferred over the networking system to the computer so that a user can remotely control the computer while viewing the monitor output on the television.

Typically, the data signals are transmitted between the networked devices over a hard wire network, such as a coaxial cable, Ethernet, phone lines, or power lines. Alternatively, the data signals can be transmitted wirelessly using a radio frequency carrier wave.

However, in many home installations there is no one wired network available that can carry data from a source location (for example, a computer) to any room in the home. Wireless rf networking systems are less than adequate due to attenuation of the rf signal within the home because of, for example, the absorption and reflection of the rf signal when it encounters typical home building materials such as drywall, foil-backed insulation, concrete block, etc. Simply boosting the antenna power output from the point source of the signal (in this example, the location of the computer) to the receiving antenna (in this case, the mobile wireless display terminal wireless display terminal) is often not an effective solution. For such point-to-point transmission to be effective, the signal power may have to be boosted to a level that exceeds the maximum FCC (or other regulatory body) limitations. Also, the boosting of the antenna output may be undesirable in situations where the signal will interfere with other devices, or be susceptible to eavesdropping by neighbors, etc.

Accordingly, there is a need for a networking solution that combines the mobility and flexibility of a wireless network with the security and signal consistency of a hard wired network.

Further, there are many types of mobile computing devices, such as portable lap top

39 *computers, portable televisions, cordless phones, and the like. However, these devices are*

1 not effective for simultaneously display computer-generated images, Internet content and  
2 full motion video.

3

4 **SUMMARY OF THE INVENTION:**

5 It is an object of the present invention to provide a multimedia network for enabling  
6 the viewing of computer-generated data on any television, video and/or audio display  
7 connected to a multimedia network, such as a hard wired coaxial television cable network.  
8 It is a further object of the present invention to provide a multimedia network for enabling  
9 the remote control of a computer via control signals carried over the multimedia network. It  
10 is a further object of the present invention to provide a multimedia network for enabling the  
11 remote control of a video device via control signals generated by a computer and carried  
12 over the multimedia network, and for enabling the viewing of computer-generated data on  
13 any television, video and/or audio display connected to a multimedia network. It is another  
14 object of the present invention to provide a method for indicating the content recorded on a  
15 video recorder. It is another object of the present invention to provide a video recording  
16 system for recording content-indicating information on a video recording medium. It is  
17 another object of the present invention to provide a wireless display terminal. The wireless  
18 display terminal receives a video signal originating from a computer, multimedia or other  
19 audio and/or video signal generating device and transmitted via RF signals from an antenna  
20 node. It is another object of the present invention to create a controllable, high security, low  
21 emission, clear and consistent wireless signal zone anywhere desired within the office or  
22 home. The present invention includes antenna node devices that connect with pre-existing  
23 wire networks and act as a bridge between wireless devices and the hardwire network.  
24 The use of the pre-existing wire network creates an efficient and effective transmission  
25 path for connectivity between the antenna node devices and devices connected to the  
26 coax. The use of wireless network components creates the opportunity for mobility and  
27 avoids the problems associated with installing new wires.

28 In accordance with the present invention, implemented through the inventive  
29 algorithms, methods and devices, and as described herein and shown in the drawings, a  
30 number of useful features are enabled throughout any home or office having the  
31 inventive multimedia system installed. These features include the following, and a  
32 variety of others described herein. Internet and email from any television. Run  
33 computer applications from any television. Play computer CD-ROM games at any  
34 television. Play a DVD-ROM movie from your computer and watch it on any TV in the  
35 house. View the output of any video device (satellite, cable box, VCR or video  
36 recorder, DVD, WebTV) on any TV. Use a VCR in one room to make a copy of a tape  
37 from a VCR or video recorder in another room. Control any computer, video or audio  
38 device from any room in the house. Video intercom between any of the TVs in the  
39 house. *SPEAKER PHONE with advanced caller id, message  
mailbox and address list from*



1 any television. Advanced VCR or video recorder content-indicating recording and  
 2 control. Multiple screen picture-in-a-picture on any TV. Point and click VCR or video  
 3 recorder programming. Automatic profile-based television show selection and VCR  
 4 programming. Wireless sound activated video baby monitor or security camera  
 5 viewable on any TV. In-house digital data transfer between computers, printers and  
 6 other peripherals. Home automation with voice activation as well as feedback and  
 7 control displays on any TV. Compatible with most or all conventional analog  
 8 televisions, computer monitors and HDTV. Compatible with most or all cable and  
 9 satellite set top boxes, Internet appliances, VCRs, DVDs. Compatible with home  
 10 automation systems such as X-10.

11 The inventive system also comprises a number of embodiments of a wireless  
 12 display terminal. The wireless display terminal receives a video signal originating from  
 13 a centralized computer and transmitted via RF signals from an antenna node. The  
 14 antenna node may be located in the proximity of the centralized computer, or may be  
 15 connected to the centralized computer through a wire network, such as a phone line, co-  
 16 axial cable, electrical power line, fiber optic, data line, or other wire network. The  
 17 wireless display terminal may also receive signals from a video and/or audio signal  
 18 source, such as a video recorder, set top box, telephone system, video camera,  
 19 intercom, security system, home automation system, or other video and/or audio signal  
 20 generator. The video and/or audio signals are again transmitted via RF signals from the  
 21 antenna node located in proximity with the video and/or audio signal source or  
 22 connected to the source through the wire network.

23 The inventive wireless display terminal may include video and/or audio signal  
 24 generating and transmitting components, such as a CCD camera, microphone and RF  
 25 signal transmitter. The wireless display terminal may thus be used for two-way audio  
 26 and/or video communication with various display devices connected to the inventive  
 27 network, and through the network connection, with various external devices and  
 28 systems. For example, the wireless display terminal can be used as a remote video and  
 29 audio link for external communication through a telephone or video conferencing  
 30 system, and through the Internet or other network system. The wireless display  
 31 terminal may also be used for a video and/or audio intercom system with other devices  
 32 connected locally to the inventive multimedia network.

33 The wireless display terminal can be used as a highly portable personal digital  
 34 assistant. When within the range of its "home" multimedia network, the wireless  
 35 display terminal acts as a mobile computer monitor and television or video recorder  
 36 display. Through the remote control of the centralized computer, the wireless display  
 37 terminal effectively has the computational power of the centralized computer. The  
 38 inventive wireless display terminal may include on-board intelligence, such as a CPU or  
 39 *MICROPROCESSOR, TO ENABLE IT TO FUNCTION AS A PDA EVEN WHEN OUTSIDE  
 THE RANGE OF THE*

1 inventive multimedia network. Further, the wireless display terminal can also be used  
2 with other wireless networks other than its "home" network.

3 The wireless display terminal can also have sufficient on-board storage to enable  
4 it to download HTML and other documents from network connections such as the  
5 Internet. The Internet connection can be direct via an on-board modem, or it can  
6 indirect through data transferred from the centralized computer.

7 The inventive wireless display terminal can include a control signal generator for  
8 generating control signals that are effective to remotely control the operation of the  
9 centralized computer. The control signal generator can also directly control the various  
10 appliances and devices in the home through the emission of infrared or other wireless  
11 signals, or these appliance and devices can be indirectly controlled via the control of the  
12 centralized computer.

13 The inventive system includes modular units (starting from a basic configuration  
14 that can be built upon to add functionality) that are easy to install into the pre-existing  
15 home coaxial cable television network, telephone or electrical wiring, can be included in  
16 the wiring of a new construction, installed as a wireless system, or include a  
17 combination of different hard wire and/or wireless nodes. In its basic form, the system  
18 lets any TV in the house act as a computer monitor, and allows the computer to control  
19 the video devices distributed through out the house, such as TVs, VCRs and cable set  
20 top boxes, and audio devices such as stereos, CD players, etc. The computer control of  
21 the devices, such as TVs, VCRs, etc., combined with the availability of the computer  
22 and device output on any television enable a host of useful and novel features,  
23 distributing virtual computer intelligence throughout the relatively "dumb" pre-existing  
24 home stereo and video devices. The video and/or audio output of any video device,  
25 audio device or computer on this multimedia network can be made available on any  
26 device on the network that is capable of using the output.

27 With the installation of the basic configuration, any room in the home that has a  
28 coaxial cable hook-up becomes a network node. For those locations that do not have a  
29 coaxial cable hook-up, a wireless node can be provided. In the preferred configuration,  
30 each node includes an addressable interface unit that has some limited built-in  
31 intelligence. A centralized conventional home desktop computer does the bulk of the  
32 processing power. For those homes without a computer, a dedicated microprocessor  
33 can be provided that allows for the operation of most of the inventive system features.

34 The inventive system is designed from the ground-up to be extremely simple to  
35 install and initialize, with automatic upgrade potential and system diagnosis that  
36 maintains trouble free operation. The inventive system is compatible with most any  
37 cable, satellite or broadcast television connection.

1 With the basic configuration installed, any TV in the home will have access to  
2 the Internet, email, computer gaming and any other typically used computer function  
3 (record keeping, word processing, scheduling, etc.).

4 Other features include a video intercom system that allows for two-way video  
5 and audio communication between users located at different rooms in the home. A  
6 speaker phone system with advanced caller id and voice activation, as well as an  
7 Internet-based video telephone system that allows two-way video and audio  
8 communication between users at different locations anywhere in the world (from the  
9 comfort of their respective living room couch). A sound and/or motion activated  
10 wireless video monitor automatically turns on any selected television(s) and alerts when  
11 the baby cries or when someone is at the door. A home stereo distribution system  
12 allows a home stereo located in any room in the house to be controlled and listened to  
13 (using the television speakers, if available) from any other room in the house.

14 The inventive system includes an advanced VCR control system that provides  
15 content-indicating recording and detection for recording and displaying content-  
16 indicating information to and from a videotape. A VCR located anywhere in the home  
17 is controlled to record a computer-generated information header at the beginning of the  
18 videotape. The recorded signal is a WWW-like content page that can be displayed on  
19 any television via the computer-network connection, with hyperlinks that correspond to  
20 the television programs recorded on the videotape. Alternatively, each videotape can  
21 have a tape identification signal recorded continuously recorded on it. The tape  
22 identification signal corresponds to a tape database stored in the computer hard drive or  
23 other storage device 24. In addition to the tape identification, the header or other  
24 locations on the tape and the tape database contain information such as what is recorded  
25 on the tape, the location of commercial breaks, amount of time left for recording on the  
26 tape, amount of time of content recorded on the tape, tape location marks, the locations  
27 of the beginning and ending of programs recorded on the tape, hyperlinks and web-like  
28 html pages (which may correspond to the content recorded on the tape, or be provided  
29 for other purposes, such as advertisements and program and movie previews), still  
30 photos, and other data. In the case of the hyperlinks and web-like pages, multiple  
31 pages may be downloaded from the videotape to the computer to be cached. The data  
32 can be provided in the vertical-blanking interval and/or at any other recordable portion  
33 of the videotape (such as just prior to the start of the program). Further, a short segment  
34 of each program recorded on the tape can be provided at or near the beginning of the  
35 tape, and its location identified either by data recorded on the tape and/or in the  
36 database, so that the viewer can get a glimpse of what each program is about.

37 As an example of the inventive system's advanced VCR features, when a  
38 videotape is inserted in any of the home's VCRs, a content page can be uploaded from the  
39 VCR to the computer for display on a TV located anywhere in the house / or not

1 necessarily in the room where the VCR or the computer is located). The playback of  
 2 the tape can be controlled via signals generated in accordance with software running on  
 3 the remotely located computer. The content page includes links to the Internet for  
 4 information relevant to the recorded show, suggestions of similar shows, etc. By  
 5 activating one of the content page's hyperlinks, the user selects a recorded TV show to  
 6 watch. The computer receives the selection and controls the VCR to cue up the selected  
 7 recorded TV show and begin playback. Using a determined user-profile (determined  
 8 by a questionnaire and/or by a data base of the TV viewing habits of the household), the  
 9 computer can be used to predict what shows the user might be interested in, access the  
 10 Internet or electronic programming guide, and automatically control the VCR to record  
 11 these shows anytime during the day or evening without any additional user input.

12 In accordance with an embodiment of the inventive multimedia network, a first  
 13 computer node is provided including computer display local channel generating means  
 14 for generating a computer display local television channel containing a video output  
 15 signal corresponding to a computer display output signal generated by a computer  
 16 locatable at the computer node. The computer display local television channel being  
 17 effective for allowing displaying of video data generated by the computer on an  
 18 ordinary television located on the multimedia network remotely from the computer.  
 19 Device control signal generating means controllable by the computer generates device  
 20 control signals transferable over the multimedia network. The device control signals are  
 21 effective to selectively control at least one video device located on the multimedia  
 22 network remotely from the computer. Computer control signal receiving means  
 23 receives computer control signals transferred over the multimedia network. Content  
 24 determining means determines content-indicating information corresponding to the  
 25 content recorded on or to be recorded on videotape. Cue determining means determines  
 26 control cue information for automatically controlling a videotape recorder. Converting  
 27 means converts the determined content-indicating information into recordable content  
 28 data. Generating means generates a recordable information signal for recording on the  
 29 videotape. The generating means includes content signal generating means for  
 30 generating a recordable content signal corresponding to the recordable content data, cue  
 31 signal generating means for generating a recordable control cue signal corresponding to  
 32 the control cue information and combining means for combining the recordable content  
 33 signal with the recordable cue signal to generate the recordable information signal.  
 34 Transferring means transfers the recordable information signal to a videotape recorder,  
 35 and video device controlling means controls the videotape recorder to record the  
 36 recordable information.

37 The video device controlling means includes playback controlling means for  
 38 controlling the video recorder to playback a recorded information signal including the  
 39 *RECORDABLE CONTENT SIGNAL PREVIOUSLY RECORDED ON THE*  
*videotape. Detecting means*

1 detects the content-indicating information from the recordable information signal so that  
2 an indication of the recorded content of the videotape can be displayed. The  
3 transferring means includes means for transferring the recordable information signal to  
4 an information signal detecting means.

5 A video device node is included on the multimedia network. Video device local  
6 channel generating means generates a video device local television channel containing  
7 the video and/or audio output of the video recorder or other multimedia device located at  
8 the video device node. In accordance with the inventive VCR tape content indicating  
9 aspects of the present invention, the recorded information signal played back from the  
10 videotape is included in the video and audio output of the video recorder. Device  
11 control signal emitting means receives the device control signals and emits video device  
12 control signals effective for controlling the video recorder located on the multimedia  
13 network remotely from the computer. Thus, the video device can be remotely  
14 controlled by the computer. The video device node further includes computer control  
15 signal generating means controllable by a user input device for generating computer  
16 control signals transferable over the multimedia network so that the computer can be  
17 remotely controlled in response to a user input.

18 The detecting means includes means for detecting control cue information from  
19 the recordable information signal. The device control signal emitting means emits  
20 device control signals for automatically controlling the videotape recorder depending on  
21 the control cue information.

22 The video device local channel generating means includes means for generating  
23 the video device local television channel as at least one of dc signals, rf signals  
24 carryable over a conductive wire, light spectrum signals carryable over a fiber optic,  
25 wireless rf signals and wireless IR signals; and the computer control signal generating  
26 means includes means for generating the computer control signals as at least one of dc  
27 signals, rf signals carryable over a conductive wire, light spectrum signals carryable  
28 over a fiber optic, wireless rf signals and wireless IR signals. In accordance with one  
29 embodiment, the video device local channel generating means includes means for  
30 generating the video device local television channel as rf signals carryable over a pre-  
31 existing home coaxial cable television network, and the computer control signal  
32 generating means includes means for generating the computer control signals as dc  
33 signals carryable over the pre-existing home coaxial cable television network.

34 In order to avoid any conflicts with televisions channels available from a cable  
35 television provider (or other television service provider), the rf signals can be  
36 modulated by carrier frequencies that are outside the range allotted to television  
37 channels, or outside the range of frequencies that are tunable by an ordinary television.

38 In this case, the frequencies that are used to generate the local television channels can  
39 be preset, making the implementation of the circuitry less complicated as compared with a

1 system that must first determine which channels are available, find a suitable channel  
2 that does not have too much interference from an adjacent channel, filter out the suitable  
3 channel, and then use a variable frequency generator to generate the suitable channel for  
4 use as a carrier frequency for the local channel. Rather, in accordance with this aspect  
5 of the present invention, a predetermined set of frequencies can be generated by preset  
6 frequency generator(s), and their association as a local channel generator for a device  
7 manually set by the user.

8 The computer display local channel generating means may include high-  
9 definition signal generating means for generating the local television channel as  
10 containing the video output signal as high-definition-display-device-driving information  
11 for driving a high definition display such as a computer monitor or high definition  
12 television. The inventive multimedia network may include a high-definition node  
13 having display-driving means for receiving the local television channel containing the  
14 high-definition-display-device-driving information and for driving a high definition  
15 display device.

16 The first computer node includes computer data signal generating means for  
17 generating a computer data signal in accordance with computer data received from the  
18 computer for transfer of the computer data signal over the multimedia network. The  
19 inventive multimedia network may include a computer device node having computer  
20 data signal receiving means for receiving the computer data signal from the multimedia  
21 network for transfer to a second computer or computer data using device such as a  
22 printer or data storage device 24 locatable at the second computer node.

23 The computer data signal generating means includes means for generating the  
24 computer data signal as at least one of dc signals, rf signals carryable over a conductive  
25 wire, light spectrum signals carryable over a fiber optic, wireless rf signals and wireless  
26 IR signals.

27 A second computer node may be provided on the inventive multimedia network.  
28 The second computer node has another computer display local channel generating  
29 means for generating another computer display local television channel containing a  
30 video output signal corresponding to a computer display output signal generated by a  
31 second computer. Another computer control signal receiving means receives the  
32 computer control signals transferred over the multimedia network.

33 Further, the multitasking and multiple monitor display capabilities enabled by  
34 conventional desktop computer operating systems are taken advantage of in accordance  
35 with the present invention. Multiple users of the same computer can be accommodated  
36 simultaneously by generating a plurality of local television channels that each  
37 correspond with a respective computer monitor output signal. The familiar desktop  
38 elements such as task bars, menus and available files and storage devices can be

39 *replicated for each user by generating windows having the appropriate user interface*

1 elements. Further, the preferences of each user can be maintained in a user database so  
 2 that a particular desktop and available features are displayed through a customizable  
 3 graphical user interface.

4 In accordance with the present invention, addressable controlling means may be  
 5 provided including an address signal generator for generating an address signal and  
 6 address signal receiver for receiving the address signal. The address signal generator  
 7 being controllable by the computer, controlled through manual input or managed by a  
 8 stand-alone microprocessor. The address signal receiver is effective for controlling the  
 9 device control signal emitting means to emit the device control signal depending on the  
 10 received address signal. Thus, the devices on the inventive multimedia network can be  
 11 selectively controlled depending on the address signal associated with the particular  
 12 device or node. The address signal generating includes means for generating the  
 13 address signal as a signal carryable over a pre-existing home coaxial cable television  
 14 network and connecting means for connecting the address signal generator to the pre-  
 15 existing home coaxial cable television network. A selectable channel filtering means  
 16 selectably filters channel frequencies carried on a television signal source in  
 17 communication with the multimedia network, the selectably filtered channel frequencies  
 18 are thus made available for use as local television channels.

19 In accordance with the present invention, the inventive multimedia network can  
 20 be used to provide enhanced uses of the pre-existing video, audio and multimedia  
 21 device in a home. For example, each room of the home that has a television can  
 22 become part of an in-home speaker phone, video phone or video intercom system. In  
 23 accordance with this aspect of the invention, at least one microphone input located at a  
 24 location on the multimedia network is provided for receiving microphone signals.  
 25 Selecting means, such as a relay circuit, selects the input of the microphone signals and  
 26 adding means adds the selected input of the microphone signals to be carried on the  
 27 multimedia network. Means, such as a connection with the speakers of a pre-existing  
 28 TV or stereo system generates audible sound signals corresponding to the selected input  
 29 of the microphone signals at a location on the multimedia network remote from the  
 30 location of the at least one microphone input receiving the selected input of the  
 31 microphone signals. At least one video camera input is located at a location on the  
 32 multimedia network for receiving video camera signals. Selecting means selects the  
 33 input of the video camera signals, and at least one of the computer display local  
 34 television channel generating means and the video device local television channel  
 35 generating means includes means for including the selected input of the microphone  
 36 signals and the selected input of the video camera signals in the corresponding computer  
 37 display local television channel and the video device local television channel.

38 In the case of a home speaker-phone system, means is provided for connecting  
 39 *the selected input of the microphone signals to a telephone system. Means for notifying*

1 the existence of a received telephone call on at least one display connected to the  
2 multimedia system and means for answering the received telephone call and selecting  
3 the input of the microphone signals received by the microphone input are also provided.  
4 These can all be done through the telephony circuitry and appropriate software control  
5 of available personal computer system, or a stand-alone microprocessor or telephony  
6 circuitry can be employed. Means may be included for determining a telephone number  
7 of a received telephone call. In this case, the caller-id data carried with a conventional  
8 telephone call signal is accessed and the origin phone number is determined. Means is  
9 provided for displaying the determined telephone number on said at least one display.  
10 The determined phone number may be displayed as an over-layer graphic that is generated  
11 and combined with the video signal (such as a TV program) that is being displayed.

12 In accordance with the addressable capabilities of the present invention, it can be  
13 determined in what room the user is that is taking the phone call by detecting the  
14 address signal generated along with the computer or device control signals when the  
15 user selects to take the call. Thus, the microphone and or video camera only at that  
16 location is activated to carry the phone, video phone or video intercom conversation.

17 Means may be provided for connecting to the Internet and downloading Internet  
18 data, along the lines of the commercially available WebTV Internet appliance, cable or  
19 teleco modems, etc. Internet video output signal generating means receives the Internet  
20 data and generates an Internet video signal dependent thereon. The device local channel  
21 generating means includes means for generating the video device local television signal  
22 containing the Internet video output signal data.

23 The computer can be connected to the Internet via means for connecting the  
24 computer to the Internet and downloading Internet data (such as a conventional  
25 modem). The computer display local channel generating means includes means for  
26 generating the computer display local television signal containing the Internet video  
27 output signal data.

28 Device control signals can be transferred over the multimedia network between  
29 the location of the user and the Internet connected device to allow for navigation of the  
30 Internet content. Thus, a single Internet accessing device can be used to provide  
31 Internet access on any display device on the inventive multimedia network.

32

### 33 **BRIEF DESCRIPTION OF THE DRAWINGS:**

34 Figure 1 is a block diagram showing the basic configuration of the inventive  
35 multimedia network;

36 Figure 2(a) is a block diagram showing a computer-enabled VCR system in  
37 accordance with the present invention;

38 Figure 2(b) is a block diagram showing the inventive VCR/Internet appliance;



1        Figure 2(c) is a block diagram showing a configuration of an inventive multiple  
2 node wireless multimedia network;

3        Figure 2(d) is a block diagram showing a DVD recorder system controlled over  
4 the inventive multimedia network in accordance with the present invention;

5        Figure 2(e) is a block diagram showing a computer-enabled DVD or random  
6 access recorder system in accordance with the present invention;

7        Figure 2(f) is a block diagram showing a DVD/RAM/Internet appliance;

8        Figure 2(g) illustrates a variety of random access memory configurations for a  
9 random access video recorder in accordance with the present invention;

10       Figure 3(a) is a block diagram of the inventive video recording system for  
11 recording content-indicating information on a videotape;

12       Figure 3(b) is a block diagram of the inventive multimedia network including  
13 the inventive video recording system for recording content-indicating information on a  
14 videotape;

15       Figure 3(c) is a block diagram of the inventive multimedia network including the  
16 inventive video recording system, in-house video intercom, multiple computer device  
17 nodes and other inventive features and enhancements;

18       Figure 3(d) is a block diagram illustrating the connecting through a  
19 communications network such as the Internet or telephone lines connection to another  
20 multimedia network of the inventive multimedia network shown in Figure 3(c), and  
21 showing a video telephone conversation between a user located at the multimedia  
22 network shown in Figure 3(c) with another user located at the other multimedia  
23 network;

24       Figure 3(e) is a block diagram showing a mixed network system for connecting  
25 various node of the inventive multimedia network, including a connection between a  
26 computer node and a first device node via data transferred through a home electrical  
27 wiring network and a connection between the second device node and the first device  
28 node via a home co-axial cable connection;

29       Figure 3(f) is an illustration showing a wireless audio transmission system for  
30 effecting the control of a VCR and a remotely located computer in response to audio  
31 tone and speech recognition signals transmitted via a wireless audio transmitting user  
32 remote controller;

33       Figure 3(g) is a table showing the mapping of the remote control buttons to  
34 frequency or pulse train signals corresponding to software-determined variable  
35 functions for controlling various appliances and devices using a single remote control  
36 unit.

37       Figure 3(h) is a block diagram showing the components of the set top box  
38 shown atop the VCR in Figure 3(e) and the remote control unit;

1        Figure 3(i) is a block diagram of an embodiment of the inventive multimedia  
 2 network having a computer node with multiple TV channel tuning capabilities, and a  
 3 manual user selectable local channel frequency selection means for assigning the local  
 4 channels containing the computer video output and the device video output in a  
 5 manually defined manner;

6        Figure 3(j) is a flow chart showing the initialization of the inventive multimedia  
 7 network system;

8        Figure 3(k) is a block diagram showing an embodiment of the inventive  
 9 multimedia network configured for allowing multiple simultaneous users of a single  
 10 computer with separate computer generated video information displayed on three  
 11 remotely located televisions or other display devices connected to the inventive  
 12 multimedia network;

13        Figure 3(l) is a flow chart for enabling multiple simultaneous users of a single  
 14 computer with separate computer generated video information displayed on three  
 15 remotely located televisions or other display devices connected to the inventive  
 16 multimedia network;

17        Figure 3(m) is a block diagram of the inventive multimedia network having a  
 18 device remote control signal detector and a device status detector for enabling the  
 19 computer to determine the status of a device, such as its on/off state, and the operation  
 20 of the device, such as remote controlled channel selection, for a device connected with  
 21 the inventive multimedia network;

22        Figure 3(n) is a block diagram of an embodiment of the inventive multimedia  
 23 network utilizing local television channels that are outside the frequency range of  
 24 normally received television channels;

25        Figure 3(o) is a block diagram showing a configuration of the inventive  
 26 multimedia network for directing data to and for controlling devices capable of  
 27 recording one type of data to record data not normally recorded by the device;

28        Figure 3(p) illustrates a configuration of the inventive multimedia network  
 29 having a wireless connection between the computer node and a wirelessly linked  
 30 computer; the wireless linked computer being enabled for use with the inventive  
 31 multimedia network via wireless components incorporated in a standard PCI or  
 32 expansion module;

33        Figure 3(q) illustrates a configuration of the inventive multimedia network  
 34 having a wireless connection between the computer node and a wireless display  
 35 terminal, the wireless display terminal being enabled with a wireless transmitter and  
 36 receiver for use with the inventive multimedia network and for use with other similarly  
 37 configured wireless display terminals;

38        Figure 3(r) illustrates a configuration of the inventive multimedia network  
 39 *having a wireless connection between the computer node and a wireless display*

1 terminal, the wireless display terminal being capable of sending video and audio back to  
2 the multimedia network and to other similarly configured wireless display terminals;

3 Figure 3(s) illustrates a configuration of the inventive multimedia network  
4 having a wireless connection between the computer node and a wireless display; the  
5 wireless display terminal being comprised of relatively low cost components;

6 Figure 3(t) illustrates a configuration of an embodiment of a touch screen  
7 wireless remote control device for displaying a same image on the remote control device  
8 screen as is shown on a large display connected with the inventive multimedia network;

9 Figure 4(a) is a flowchart showing the basic method for recording content-  
10 indicating information on a VCR tape in accordance with the present invention;

11 Figure 4(b) is a flowchart showing the basic method for playing back content-  
12 indicating information recorded on a VCR tape in accordance with the present invention;

13 Figure 4(c) is a flowchart showing the basic method for recording content-  
14 indicating information on a DVD or other random access recorder in accordance with  
15 the present invention;

16 Figure 4(d) is a flowchart showing the basic method for playing back content-  
17 indicating information recorded on a DVD or other random access recorder in  
18 accordance with the present invention;

19 Figure 4(e) illustrates a random access disk recording media having program  
20 content, a program content indicating document, and program content and document  
21 address index signal recorded thereon in accordance with the present invention;

22 Figure 4(f) is a flow chart showing the steps for controlling remote devices  
23 using the inventive wireless terminal via a remote computer in accordance with the  
24 present invention;

25 Figure 4(g) is a flow chart showing the steps for choosing the display selection  
26 for the inventive wireless terminal;

27 Figure 5 is a block diagram illustrating a configuration of the inventive  
28 multimedia network configured as stand-alone accessory boxed distributed on network  
29 through direct and wireless connections;

30 Figure 6 is a block diagram showing the use of microphone and speaker ports  
31 of a computer or video device for transferring signals for recording and receiving VCR  
32 tape content information over the inventive multimedia network;

33 Figure 7 is a block diagram showing the inventive multimedia network  
34 configured as an add-on part for a computer and imbedded VCR system;

35 Figure 8 is a block diagram showing the inventive multimedia network  
36 distributed over an existing home phone line network for transferring video, audio  
37 and/or computer data as a digital and/or analog signal;

1        Figure 9 is a block diagram showing the inventive multimedia network  
2 distributed over an existing home coaxial cable television network for transferring  
3 video, audio and/or computer data as a digital and/or analog signal;

4        Figure 10 is a block diagram showing the inventive multimedia network  
5 distributed over the existing home electrical wiring network for transferring video,  
6 audio and/or computer data as a digital and/or analog signal;

7        Figure 11 is a block diagram illustrating the capabilities of a single computer-  
8 enabled set top box being available at any TV on the inventive multimedia network;

9        Figure 12 shows the details of a distributed computer-enabled set top box  
10 capabilities distributed over the inventive multimedia network;

11       Figure 13 is a block diagram showing a basic configuration of an inventive  
12 addressable multimedia network;

13       Figure 14(a) is a schematic representation of a VCR tape recorded in accordance  
14 with the inventive method for indicating the content recorded on a videotape;

15       Figure 14(b) is a schematic representation of a VCR tape recorded with short  
16 portions of the different television programs or home video recording segments  
17 recorded at the beginning of the tape for facilitating recorded content selection;

18       Figure 14(c) is an drawing schematically illustrating data recorded on a  
19 conventional VCR tape, showing a portion of the tape being used to record audio and  
20 video information that is actually displayed on a television, and another portion of the  
21 tape having room for piggyback data;

22       Figure 14(d) is an drawing schematically illustrating data recorded on a  
23 conventional VCR tape, showing a portion of the tape being used to record audio and  
24 video information that is actually displayed on a television, and another portion of the  
25 taped being used for recording inaudible tone signals used as recorded control cue  
26 information recorded throughout the tape or at specific locations in accordance with the  
27 present invention;

28       Figure 14(e) is an drawing schematically illustrating data recorded on a  
29 conventional VCR tape, showing a portion of the tape being used to record audio and  
30 video information that is actually displayed on a television, and another portion of the  
31 taped being used for recording tape identifying information and location on tape  
32 identifying information throughout the tape or at specific locations in accordance with  
33 the present invention;

34       Figure 14(f) is an drawing schematically illustrating data recorded on a  
35 conventional VCR tape, showing a portion of the tape being used to record audio and  
36 video information that is actually displayed on a television, and another portion of the  
37 taped being used for recording tape identifying information and/or location on tape  
38 identifying information and/or commercial skip data throughout the tape and/or at  
39 specific locations in accordance with the present invention;

- 1       Figure 15 is a schematic representation of the VCR tape shown in Figure 14(a);  
2       Figure 16 is a schematic representation of the VCR tape shown in Figure 14(a);  
3       Figure 17 is a flow chart showing a tape formatting operation in accordance  
4 with the inventive method for indicating the content recorded on a videotape;  
5       Figure 18 is a flow chart of a pre-recording procedure in accordance with the  
6 inventive method for indicating the content recorded on a videotape;  
7       Figure 19 is a flow chart of the tape recording procedure in accordance with the  
8 inventive method for indicating the content recorded on a videotape;  
9       Figure 20 is a flow chart showing the playback procedure of a selected pre-  
10 recorded program in accordance with the inventive method of indicating the content  
11 recorded on a videotape;  
12       Figure 21 is a block diagram showing an example configuration of the inventive  
13 multimedia network containing multi-purpose nodes distributed over a pre-existing  
14 coaxial cable television network;  
15       Figure 22 is a continuation of the example multimedia network shown in Figure  
16 21;  
17       Figure 23 is a continuation of the example multimedia network shown in Figure  
18 21;  
19       Figure 24 is a continuation of the example multimedia network shown in Figure  
20 21;  
21       Figure 25 is a perspective view of a wireless multimedia computer for use with  
22 the wireless distribution node of the inventive multimedia network shown in Figure 24;  
23       Figure 26 is a schematic side view showing parts of the wireless computer  
24 shown in Figure 24;  
25       Figure 27(a) is a front view of a wireless display terminal or use with the  
26 wireless distribution node of the inventive multimedia network shown in Figure 24;  
27       Figure 27(b) is a perspective view of a wireless display terminal or use with the  
28 wireless distribution node of the inventive multimedia network shown in Figure 24;  
29       Figure 28(a) is an isolated view of a touch screen user input device and LCD  
30 display screen, with a block diagram showing the components of an embodiment of the  
31 inventive wireless display terminal;  
32       Figure 28(b) is a front view of an embodiment of the inventive wireless display  
33 terminal having an attachable touch screen/display unit that can be attached to a self-  
34 contained wireless computer as shown in Figure 26, with a wireless component unit  
35 attached to the touch screen/display unit;  
36       Figure 28(c) is a front view of the wireless display terminal shown in Figure  
37 28(b) having the wireless component unit being detached;  
38       Figure 28(d) shows an embodiment of the inventive wireless display terminal  
39 mounted on a keyboard stand;

1       Figure 28(e) shows the wireless display terminal being detached from the  
2 keyboard stand;

3       Figure 28(f) shows the wireless display terminal having the keyboard stand  
4 being placed in a stowed position;

5       Figure 28(g) shows the wireless display terminal having the keyboard stand  
6 disposed in the stowed position behind the display screen;

7       Figure 28(h) shows the wireless display terminal having the keyboard stand  
8 disposed in a protective position in front of the display screen;

9       Figure 28(i) shows a wireless display terminal having an internally disposed  
10 directional antenna for use in communicating with the remote computer, devices  
11 connected with the multimedia network, wireless modem, and/or radio telephone;

12       Figure 28(j) is a side view showing the wireless display terminal shown in  
13 Figure 28(i) and showing an internally disposed directional antenna, communication  
14 circuit and display screen;

15       Figure 28(k) is a perspective view of an inventive personal digital assistant  
16 having the inventive antenna assembly mounted for wireless communication; and

17       Figure 28(l) is a side view of the personal digital assistant shown in Figure  
18 28(k), schematically showing a communication circuit, display screen and the inventive  
19 antenna assembly;

20       Figure 28(m) is an isolated enlarged cross sectional view of a flexible  
21 rechargeable battery used in accordance with the present invention;

22       Figure 28(n) is an isolated schematic view of a wireless terminal circuit board  
23 disposed adjacent to the flexible rechargeable battery;

24       Figure 28(o) is a cross sectional top view of a flexible rechargeable battery and  
25 wireless terminal case shell prior to assembly in accordance with a manufacturing aspect  
26 of the present invention;

27       Figure 28(p) is a cross section top view of the assembled flexible rechargeable  
28 battery and wireless terminal case shown in Figure 28(o);

29       Figure 28(q) is a cross sectional side view taken along line c-c of the assembled  
30 flexible rechargeable battery and wireless terminal case shown in Figure 28(p);

31       Figure 28(r) is an isolated enlarged cross sectional side view of an assembled  
32 and electrically sealed end of the wireless terminal case shown in Figure 28(q);

33       Figure 28(s) is an enlarged cross sectional view of an antenna assembly in  
34 accordance with the present invention;

35       Figure 28(t) is a cross sectional view along line 40-40 of Figure 28(s);

36       Figure 28(u) illustrates an inventive wireless display terminal having computer  
37 controlled display-changeable button function names mapped to side buttons;

1           Figure 29 is a schematic perspective view of a bracelet personal locator for use  
2 with the wireless distribution node of the inventive multimedia network shown in  
3 Figure 24;

4           Figure 30(a) is a schematic perspective view of a badge-type personal locator  
5 for use with the inventive multimedia network shown in Figure 24;

6           Figure 30(b) illustrates an adhesive patch body circuit having a signal  
7 transmitter for use as a personal locator;

8           Figure 30(c) illustrates the adhesive patch body circuit adhered to the arm of a  
9 user;

10          Figure 30(d) illustrates an implantable body circuit having a signal transmitter  
11 implanted within the arm of a user;

12          Figure 31 is a perspective view of a hand-held personal digital assistant for use  
13 with the wireless distribution node of the inventive multimedia network in Figure 24;

14          Figure 32 is a graphic illustration of an addressable unit pulse train and device  
15 control signal pulse train;

16          Figure 33 is a block diagram showing a configuration of an addressable  
17 multimedia network having a single local channel generator at each node;

18          Figure 34 is a block diagram showing a configuration of the inventive  
19 addressable multimedia network having multiple computer nodes and video device  
20 nodes distributed on the network;

21          Figure 35 is a block diagram showing another configuration of the inventive  
22 addressable multimedia network having a node with a double local channel generator;

23          Figure 36 is a block diagram showing another configuration of the inventive  
24 addressable multimedia network having a three channel high-definition location channel  
25 generator;

26          Figure 37 is a block diagram showing another configuration of the inventive  
27 addressable multimedia network having a computer node and a computer signal device  
28 node;

29          Figure 38 is a block diagram showing a example prototype configuration of the  
30 inventive multimedia network;

31          Figure 39 shows some of the windows of the Multimedia Network prototype  
32 FaceSpan project;

33          Figure 40 shows some more of the windows of the Multimedia Network  
34 prototype FaceSpan project;

35          Figure 41(a) is a schematic diagram of an IR remote control signal playback  
36 circuit module and an IR remote control signal capture circuit module for connecting  
37 with a computer (or other remote control signal generator/detector) and the inventive  
38 multimedia network to enable the computer to capture and learn the remote control  
39 signals remotely generated by an IR generating remote control unit at a device node or at

1 the computer node, and to allow the computer to generate device control signals for  
2 controlling devices located remotely on the inventive multimedia network;

3 Figure 41(b) is a schematic diagram of an IR remote control signal playback  
4 circuit module and an IR remote control signal capture circuit module for connecting  
5 with a computer (or other remote control signal generator/detector) and the inventive  
6 multimedia network to enable the computer to capture and learn the remote control  
7 signals remotely generated by an IR generating remote control unit at a device node, and  
8 to allow the computer to generate device control signals for controlling devices located  
9 remotely on the inventive multimedia network;

10 Figure 41(c) is a schematic diagram of an IR detector and emitter unit for use at  
11 a device node to be connected via the multimedia network with the IR circuit modules  
12 shown in Figures 41(a) and (b) located at a computer node or other remote control  
13 signal generating node;

14 Figure 41(d) is a flowchart showing the steps for using the IR remote control  
15 detector shown in Figure 41(b) for learning the remote control signals for devices  
16 connected to the multimedia network;

17 Figure 42(a) shows a display device screen, such as a television, receiving  
18 video data generated by the remotely located computer indicating the initialization of a  
19 video intercom call;

20 Figure 42(b) shows a display device screen, such as a television, receiving  
21 video data generated by the remotely located computer showing a video intercom call in  
22 process;

23 Figure 42(c) shows a display device screen, such as a television, receiving  
24 video data generated by the remotely located computer showing the zooming in of the  
25 caller's image during a video intercom call;

26 Figure 43 is a flowchart showing the operation of a video intercom conversation  
27 in accordance with the present invention;

28 Figure 44(a) shows a display screen, such as a television, receiving video data  
29 generated by the remotely located computer showing a horizontal split screen with an  
30 internet web page and a television program;

31 Figure 44(b) shows a display screen, such as a television, receiving video data  
32 generated by the remotely located computer showing a picture-in-a-picture (PIP) split  
33 screen with an internet web page and a television program;

34 Figure 44(c) shows a display screen, such as a television, receiving video data  
35 generated by the remotely located computer showing a vertical split screen with an  
36 internet web page and a television program;

37 Figure 45(a) shows a display screen, such as a television, receiving video data  
38 generated by the remotely located computer showing a PIP split screen with a first



1 television program shown full screen and a second television program shown in PIP  
2 format;

3 Figure 45(b) shows a display screen, such as a television, receiving video data  
4 generated by the remotely located computer showing a PIP split screen with a first  
5 television program shown with its screen size altered to fit within one-half the display  
6 area and a second and a third television program shown in PIP format;

7 Figure 45(c) shows a display screen, such as a television, receiving video data  
8 generated by the remotely located computer showing a horizontal split screen with a  
9 first television program resized to fit within the top half the display area and a second  
10 television program resized to fit within the bottom half the display area;

11 Figure 46 is a flowchart showing the operation of a computer controlled via  
12 software to enable a remotely located device to record a radio program with a content-  
13 indicating information signal;

14 Figure 47 is a flowchart showing the operation of a computer controlled via  
15 software to enable a remotely located VCR to obtain a commercial skip VCR recording  
16 feature in accordance with the present invention;

17 Figure 48 is a flowchart showing the operation of a computer controlled via  
18 software to enable a remotely located VCR to obtain another version of the commercial  
19 skip VCR recording feature in accordance with the present invention;

20 Figure 49 is a flowchart showing the operation of a computer controlled via  
21 software to enable a remotely located VCR to playback a recorded program with the  
22 commercial skip feature in accordance with the present invention;

23 Figure 50 is a flowchart showing the operation of a computer controlled via  
24 software to enable TV viewing autopilot features in accordance with the present  
25 invention;

26 Figure 51 is a flowchart showing the operation of a computer controlled via  
27 software to enable a commercial rebound feature in accordance with the present  
28 invention;

29 Figure 52 is a flowchart showing the operation of a computer controlled via  
30 software to enable parental control features in accordance with the present invention;

31 Figure 53 is a flowchart showing the operation of a computer controlled via  
32 software to enable additional parental control features in accordance with the present  
33 invention;

34 Figure 54 is a flowchart showing the operation of a computer controlled via  
35 software to enable a voice-activated child monitor feature in accordance with the present  
36 invention;

37 Figure 55 is a flowchart showing the operation of a computer controlled via  
38 software to enable a security alert feature in accordance with the present invention;

1           Figure 56 is a flowchart showing the operation of a computer controlled via  
2 software to enable scheduling features in accordance with the present invention;

3           Figure 57 is a flowchart showing the operation of a computer controlled via  
4 software to enable a home reference system feature in accordance with the present  
5 invention;

6           Figure 58 is a flowchart showing the operation of a computer controlled via  
7 software to enable an Internet-based alert feature in accordance with the present  
8 invention;

9           Figure 59 is a flowchart showing the operation of a computer controlled via  
10 software to enable an email alert feature in accordance with the present invention;

11          Figure 60(a) is a flowchart showing the duplication of a video by remotely  
12 controlling two or more devices connected with the inventive multimedia network;

13          Figure 60(b) shows a configuration of a set top box for use with the inventive  
14 multimedia network;

15          Figure 60(c) shows an inventive wireless display terminal for use within range  
16 of a multimedia network identified on the network via addressable handshake exchange,  
17 and for use outside the range of the network for use as a stand-alone personal digital  
18 assistant, pager, cellular telephone, etc.;

19          Figure 60(d) shows an inventive wireless display terminal in use for controlling  
20 devices connected with the multimedia network through control signals communicated  
21 via a central computer;

22          Figure 60(e) shows an inventive wireless display terminal connected with a  
23 central computer of an inventive multimedia network having multiple computer display  
24 local channels;

25          Figure 60(f) shows a variety of wireless display terminals connected and  
26 communicating with each other through control signals via a central computer;

27          Figure 60(g) shows a plurality of wireless display terminals in use in a class  
28 room setting;

29          Figure 60(h) shows a wireless display terminal connected with a multimedia  
30 network having the capability of displaying TV (NTSC) and high-definition (computer  
31 monitor, HDTV) display images;

32          Figure 60(i) illustrates a home multimedia network that connects with display,  
33 input and control devices throughout the home, and that communicates with a computer  
34 system located in a vehicle node when the vehicle is in the home garage;

35          Figure 60(j) illustrates a home multimedia network having content input  
36 received through Internet, satellite, cable television, phone line and the like at a central  
37 computer and distributed via bridge circuits throughout the home via coaxial cable,  
38 phone line and electrical wiring networks

1           Figure 61 illustrates a child's toy having sensors and input mechanisms used for  
2 communicating with a remote computer via a wireless transmission and reception  
3 circuitry and display output and toy movement controlled in response to control signals  
4 originating from the computer;

5           Figure 62(a) is a block diagram showing a bridge circuit for use with the  
6 inventive multimedia network for enabling simultaneous two-way audio, video, data  
7 and control signals generated by various devices connected to the network to transmit  
8 over hard wire networks such as coaxial, phone, electrical and data line as well as for  
9 the wireless transmission of such signals;

10          Figure 62(b) shows an expansion module for use with a pre-existing notebook  
11 or desktop computer to enable simultaneous two-way way audio, video, data and  
12 control signals generated by various devices connected to the network with the pre-  
13 existing computer;

14          Figure 62(c) shows a prototype configuration demonstrating the feasibility of  
15 the inventive bridge circuit and expansion module shown in Figures 62(a) and 62(b);

16          Figure 62(d) shows an alternative embodiment of the inventive expansion  
17 module including a removable video/audio/control signal transmitter;

18          Figure 63(a) illustrates an inventive home or office network configuration,  
19 comprising a home or office network module connected to at least one I/O port and a  
20 monitor port of a computer a second network module connected at a multimedia device  
21 (VCR);

22          Figure 63(b) is a block diagram illustrating a configuration of a multimedia  
23 device transceiver network module and a computer transceiver network module;

24          Figure 63(c) illustrates an inventive home or office network configuration  
25 having a wireless network communication with a wireless display terminal wireless  
26 display terminal via at least one antenna node device directional antenna coax faceplate;

27          Figure 63(d) is a block diagram illustrating a configuration of the home or office  
28 network with a wireless signal communication between the wireless display terminal  
29 and the computer transceiver network module via the directional antenna coax faceplate;

30          Figure 63(e) illustrates the use of the inventive antenna node device directional  
31 antenna coax faceplate for creating a clear consistent wireless signal within a networked  
32 home or office;

33          Figure 64(a) is a front view of an embodiment of the inventive antenna node  
34 device directional antenna coax faceplate;

35          Figure 64(b) is a perspective view of the embodiment of the inventive antenna  
36 node device directional antenna coax faceplate shown in Figure 64(a);

37          Figure 64(c) is an isolated perspective view of a directional antenna and coax  
38 connector of the inventive antenna node device directional antenna coax faceplate shown  
39 in Figure 64(a);

1       Figure 64(d) is an isolated side view of a directional antenna and coax connector  
2 of the inventive antenna node device directional antenna coax faceplate shown in Figure  
3 64(a);

4       Figure 65(a) is an isolated side view of the directional and coax connector of the  
5 inventive antenna node device directional antenna coax faceplate shown in Figure 64(a)  
6 connected to a coax network;

7       Figure 65(b) is block diagram of an embodiment of the directional and coax  
8 connector of the inventive antenna node device directional antenna coax faceplate shown  
9 in Figure 65(a);

10       Figure 65(c) illustrates a home or office networked home having antenna node  
11 devices connected at various terminal ends of a pre-existing coax network, and further  
12 illustrating the inventive capabilities of wireless signal attenuation within the zone of  
13 coverage;

14       Figure 65(d) illustrates a home or office networked home having antenna node  
15 devices connected at various terminal ends of a pre-existing coax network, and further  
16 illustrating the inventive capabilities of wireless signal handoff between two antenna  
17 node devices within the zone of coverage;

18       Figure 65(e) illustrates a home or office networked home having a combination  
19 of coaxial antenna node devices and phone line antenna node devices installed, along  
20 with a powerline connected rf repeater unit, for creating a zone of coverage throughout  
21 a home;

22       Figure 66(a) is a side view illustrating a antenna node device having a  
23 directional antenna disposed at a signal optimizing angle;

24       Figure 66(b) is a perspective view of the antenna node device shown in Figure  
25 66(a);

26       Figure 66(c) is a perspective view of a antenna node device accessory antenna  
27 system for connecting with a pre-existing coax faceplate;

28       Figure 66(d) is a block diagram illustrating a antenna node device configuration  
29 comprising a wireless video/audio/data and control signal circuit for use within the  
30 inventive home or office network;

31       Figure 66(e) ) is a block diagram illustrating a antenna node device  
32 configuration comprising a wireless video/audio/data and control signal circuit for use  
33 within the inventive home or office network, including a phone jack connection and a  
34 voltage peak filter for detecting dc control and data signals included as voltage peaks  
35 superimposed on a constant dc power supply signal;

36       Figure 66(f) is a graph illustrating the dc control and data signals included as  
37 voltage peaks superimposed on a constant dc power supply signal;

38       Figure 66(g) illustrates an obverse side of a printed circuit board construction of  
39 the inventive circuit for an embodiment of the antenna node device, the circuit including

1 a rf signal amplifier and rf mixer for optimizing the signal transmission carried over the  
2 coax network, while allowing for a wireless signal within a suitable bandwidth (e.g.,  
3 2.4 Ghz);

4 Figure 66(h) illustrates a reverse side of the printed circuit board construction of  
5 the inventive circuit shown in Figure 66(g);

6 Figure 66(i) is a perspective view of a antenna node device accessory antenna  
7 system for connection with a pre-existing coax faceplate;

8 Figure 66(j) is a perspective view of a antenna node device stand-alone antenna  
9 system for connection with a pre-existing coax terminal connector;

10 Figure 66(k) is a perspective view of a antenna node device directional antenna  
11 coax faceplate for replacement of a pre-existing coax faceplate;

12 Figure 66(l) is a block diagram illustrating a prototype construction embodiment  
13 of the inventive home or office network;

14 Figure 67(a) is a flowchart showing the operation of an inventive analog  
15 scrambler;

16 Figure 67(b) is an example of the sync signal and frequency adjustment in  
17 accordance with the inventive analog scrambler;

18 Figure 68(a) is a block diagram illustrating a antenna node device configuration  
19 for use with a phone line network, and including device locating circuitry for use in  
20 determining the location of devices within the inventive home or office network;

21 Figure 68(b) is a block diagram illustrating a antenna node device configuration  
22 for use with a power line network for communicating wireless and hardwired signals  
23 transmitted within the inventive home or office network;

24 Figure 69(a) is a flowchart showing the steps of determining the appropriate  
25 signal power transmitted from antenna nodes within the inventive home or office  
26 network;

27 Figure 69(b) is a flowchart showing the steps of determining the location of a  
28 device located within the inventive home or office network;

29 Figure 69(c) is a flowchart showing the steps of determining the appropriate  
30 signal power transmitted between antenna nodes and wireless devices within the  
31 inventive home or office network;

32 Figure 69(d) illustrates the determination of the location of a device by detecting  
33 the distance between the device and two or more antenna nodes within the inventive  
34 home or office network;

35 Figure 69(e) is a flowchart showing the steps of using a frame buffer to limit the  
36 display degradation due to the disruption of a video signal transmitted to a device  
37 connected to the inventive home or office network;

1           Figure 69(f) is a flowchart showing the steps of compensating for microwave  
2 oven interference when transmitting data to a device connected with the inventive home  
3 or office network;

4           Figure 69(g) is a flowchart showing the steps of compensating for microwave  
5 or other pulsating interference when transmitting video data to a device connected with  
6 the inventive home or office network;

7           Figure 70(a) illustrates the use of the inventive wireless display device for  
8 displaying Internet and intranet content in external network environments, such as  
9 schools, airports, airplanes, grocery stores and the like;

10          Figure 70(b) is a flowchart showing the steps of transmitting, receiving and  
11 displaying Internet and intranet content on networked display devices;

12          Figure 71(a) is a flowchart showing the steps of using Internet-based  
13 information triggers for controlling events within a networked home or office;

14          Figure 71(b) is a table showing examples of subscriber-selected online triggers;

15          Figure 71(c) is a table showing examples of subscriber-selected trigger events;

16          Figure 72(a) illustrates the transmittal of six frames of a video stream containing  
17 six pages of a website in accordance with the inventive method of transmitting  
18 hyperlinked content to multiple display devices;

19          Figure 72(b) illustrates a blank browser page used to navigate through  
20 downloaded page content;

21          Figure 72(c) shows display information contained in Frame 1 of Figure 72(a)  
22 displayed within the browser frame shown in Figure 72(b);

23          Figure 72(d) illustrates a single frame of the video stream shown in Figure 72(a)  
24 including the display information and non-display information corresponding to page  
25 contained within the frame;

26          Figure 72(e) illustrates the various links and their operation that results when the  
27 hyperlinks shown in Figure 72(d) are activated;

28          Figure 72(f) illustrates another series of web pages that are transmitted as video  
29 data;

30          Figure 72(g) shows a web page with the corresponding non-display data  
31 included along with the page;

32          Figure 72(h) illustrates how the binary video data stream can be conveyed using  
33 just the on/off states of the pixels of the video image;

34          Figure 72(i) illustrates a video stream containing display page information  
35 contained within the displayed area of the individual video frames, and hyperlink page  
36 information and other non-display page information contained in the non-display area of  
37 the video signal or video page stream;

38          Figure 72(j) illustrates a stream of video data provided along with hyperlink,  
39 page information and other non-videographic page information, with split static

1 videographic page information provided along with split moving image videographic  
2 page information;

3 Figure 72(k) shows a block diagram of an inventive display device for use with  
4 the inventive method of transmitting hyperlinked information;

5 Figure 72(l) illustrates a wireless display device receiving a window of moving  
6 image videographic page information superimposed on a screen of static videographic  
7 page information;

8 Figure 72(m) shows a PDA-type wireless display device displaying static and  
9 moving videographic page information;

10 Figure 72(n) shows a blank page of a high speed HTML browser window in  
11 accordance with the prototype FaceSpan software program disclosed herein;

12 Figure 72(o) shows an internet page having the grid locations of the page's  
13 hyperlinks determined and the page displayed in the browser window shown in Figure  
14 72(n);

15 Figure 73(a) shows an inventive wireless display terminal capable of displaying  
16 a screen image composed of video data simultaneously received from two or more  
17 wireless sources;

18 Figure 73(b) is a block diagram illustrating an antenna node device for  
19 conditioning a wireless signal for communication over a pre-existing hard wire  
20 network; and

21 Figure 73(c) illustrates the use of the inventive antenna node devices in an office  
22 environment.

23  
24

## 25 DETAILED DESCRIPTION OF THE INVENTION:

26 For purposes of promoting an understanding of the principles of the invention,  
27 reference will now be made to the embodiments illustrated in the drawings and specific  
28 language will be used to describe the same. It will nevertheless be understood that no  
29 limitation of the scope of the invention is thereby intended, there being contemplated  
30 such alterations and modifications of the illustrated device, and such further applications  
31 of the principles of the invention as disclosed herein, as would normally occur to one  
32 skilled in the art to which the invention pertains.

33 The present invention pertains to a multimedia network that includes a computer  
34 node having a computer display local channel generator 10 that creates a local television  
35 channel of the computer monitor output (so that the computer can be displayed on any  
36 TV connected to the home coaxial network). A computer-controlled universal remote  
37 control signal generator generates device control signals that are carried over the coaxial  
38 network (so that the computer can control any IR or rf controlled appliance, like TVs,  
39 stereos and VCRs). A computer control signal receiver converts computer control

1 signals received from the coaxial network to computer input so that the user can control  
2 the computer located in the bedroom while sitting in front of the television in the living  
3 room.

4 A video device node having a device control signal emitter (for converting the  
5 universal remote control signals received from the coaxial network to IR signals for  
6 computer control of the TV, etc.). A computer control signal generator generates  
7 computer control signals that are carried over the coaxial. The computer control signal  
8 generator is controllable by a user's remote control input to enable remote control of the  
9 computer, and through the computer, remote control of any devices at the video device  
10 node or at other nodes, such as stereos, telephones, other VCRs and televisions, other  
11 computers, video cameras and home automation modules.

12 Some of the features enabled by the present invention, and described herein, are  
13 as follows. Through out this application, where appropriate, the term VCR is intended  
14 to include any video recording devices, such as DVD, hard drive and other random  
15 access and linear recording devices, and videotape is intended to include the various  
16 recording media utilized by the same. Computer-enabled VCR tape and video recorder  
17 content-indicating system. Computer-enabled VCR and video recorder commercial skip  
18 recording system. Computer-enabled commercial rebound (used while channel surfing,  
19 automatically returns viewer to the channel or origin after an elapsed time corresponding  
20 to a commercial break). A TV autopilot system allows the computer to control the TV  
21 automatically depending on the learned viewing habits of the user. A computer-  
22 enhanced phone system. Computer-enabled TV content and viewing duration parental  
23 controls. Home security/child monitor (computer automatically turns on selected TV(s)  
24 and displays person at door or baby crying). Throughout-home reference system (e.g.,  
25 ask the computer to look up "Thomas Edison" and view a multimedia display at any  
26 TV). Internet-based alerts (computer automatically turns on (if necessary) selected  
27 TV(s) and displays current stock quotes, weather bulletins, traffic conditions, etc.).  
28 Computer-enabled TV alarm clock, sleep timer, etc. Email priority filter and automatic  
29 alert system. Computer-enabled individualized viewer preferences with favorite  
30 channels, program filtering, automatic show suggestion, automatic VCR control for  
31 recording for each member of the household. Home and work scheduling system with  
32 voice interaction. Multiple screen PIP on any TV. In-home video intercom. Internet-  
33 based video phone from any TV. VCR tape editing and duplicating system remote  
34 control code learning system (lets the computer learn the remote control code pattern for  
35 any networked device, greatly simplifies initialization).

36 The present invention is an effective and efficient means for putting computer-  
37 generated video output onto a local television channel carried on a pre-existing  
38 multimedia network (such as a coaxial cable network), controlling the computer  
39 remotely by signals sent over the multimedia network, and controlling televisions,



1 VCRs, stereos and related devices connected to the network via control signals  
2 generated in response to software instructions running on the computer. The present  
3 invention is comprised of a multimedia network that includes a modular system (one  
4 that has a basic configuration that can be built upon to add functionality) that is easy to  
5 install into the pre-existing home cable television network, or that can be included in  
6 wiring of a new construction.

7 In its basic form, the system lets any TV in the house act as a computer monitor,  
8 and allows the computer to control video devices such as TVs, VCRs, security cameras  
9 and cable set top boxes; audio devices such as stereos, CD players, telephone systems;  
10 and home automation systems, etc., located anywhere in the house. The output of any  
11 video device, audio device or computer on the multimedia network can be made  
12 available on any device on the network that is capable of using the output. For  
13 example, the TV in the bedroom can be used as a monitor to display Internet content  
14 and email messages received by the computer in the home office. The computer in the  
15 home office can be used to control the recording of a television program using the VCR  
16 in the living room. The stereo in the living room can be controlled from the bedroom  
17 via remote control signals received by and generated by the computer, and CDs played  
18 through the television speakers. A CD-ROM computer game can be displayed on the  
19 living room TV and played by a user in the living room.

20 In accordance with some of the features described herein, when a user chooses  
21 a television channel to view, rather than switching the television to that channel the  
22 computer generates remote control signals that automatically switches the TV to receive  
23 the output generated by the computer. At the same time, the computer controls a TV  
24 tuner associated with it to tune in the user's selected channel, and opens a video  
25 window that displays this channel. This video window, along with control windows,  
26 are mixed into the computer display output signal, and this output signal is converted  
27 into the local channel that is displayed on the user's TV. To enable picture-in-a-picture  
28 display capabilities, the computer tunes in a second television channel using a second  
29 TV tuner associated with it and opens a second video window displayed along side the  
30 first video window. A third, or more, PIP windows can be opened in a similar  
31 manner.

32 The size and shape of the video windows are automatically controlled via  
33 software instructions to enable the viewing of multiple PIP windows without missing  
34 any portion of the displayed programs or other video content. Alternatively, the PIP  
35 windows can be overlaid on top of each other in the manner of traditional television PIP  
36 displays.

37 More features of the inventive system include an in-home video intercom, TV  
38 speaker phone with caller-id, Internet video phone on any TV or computer, and  
39 meaningful home automation capabilities. In accordance with the present invention,

1 local television channels are created to carry video, audio, analog and digital data on the  
2 home coaxial network. For example, the local channels carry the video output of a  
3 computer from a computer node, and the video output of a video or audio device, such  
4 as a VCR or cable box, from a video device node. The video devices are remotely  
5 controlled by the computer through dc signals carried over the co-axial network. The  
6 dc signals are generated at the computer node under the control of the computer and  
7 then injected onto the coaxial network. At the video device node, the dc signal is  
8 filtered out and used to generate an IR pulse train for controlling the VCR, cable box,  
9 stereo system and/or TV. The computer is remotely controlled from the video device  
10 node using an IR remote controller or IR wireless keyboard. The IR signals are  
11 converted to dc pulses and injected onto the coaxial network at the video device node  
12 and the dc pulses are converted to IR pulses at the computer node. The computer is  
13 controlled through an IR receiver connected to the keyboard or other port. In an  
14 addressable configuration of the inventive system, each IR emitter that controls a device  
15 is connected to the dc control signals through an addressable control unit. For example,  
16 before a control signal is generated by the computer, an addressable control circuit dc  
17 pulse train is generated. Each addressable control unit is deactivated until it receives the  
18 correct addressable control circuit pulse train, and it then made active. When an  
19 addressable control unit is active it passes the next dc pulse train (the device control  
20 signal) to its IR emitter for controlling a particular video device. To determine from  
21 which device node the computer control signals are coming from, the addressable  
22 control unit is used to send an address-identifying pulse train to the computer over the  
23 network. The computer then knows from where the control signals originate (important  
24 for features like the in-home video intercom and computer multitasking by two  
25 simultaneous users).

26 In accordance with one aspect of the present invention, the local channels are  
27 carried by carrier frequencies that have been allocated as the television channel  
28 frequency spectrum. For channel efficiency, and to make set-up easy for the user, a  
29 selectable channel blocker is put onto the home co-axial network at the location of the  
30 cable provider source. This selectable channel blocker is controllable by the computer  
31 to selectively filter out the carrier frequency of the selected TV channels. The TV  
32 channels that are available for becoming local television channels are determined by  
33 running a set-up procedure in which the computer (with an installed TV tuner card)  
34 steps through each channel and determines which channels are unused by the cable  
35 system provider. Once the available local channels are determined, the selectable  
36 channel blocker is controlled to filter out one channel for the output of each device on  
37 the network that will be made available via a generated local television channel. When  
38 a new module is added to the network, it outputs an address-initializing signal until it is  
39 recognized by the computer and assigned its own address. If the module includes a

1 local channel generator, another available TV channel is selected from those that were  
2 determined to be available and is filtered by the selectable channel blocker. The carrier  
3 frequency of that new filtered channel is assigned to the new local channel generator  
4 and it is set to modulate the video output of a connected device to the new local channel.  
5 Alternatively, it is possible to just filter all channels above a certain frequency, for  
6 example, in a cable system that only goes up to channel 75, a low pass filter for  
7 channels 2-75 would be all that is needed. The selectable channel blocker is preferred in  
8 terms of effectiveness since it will be adaptable to any cable system, and changes to the  
9 available channels can be accommodated by re-initializing the system.

10 Figure 1 shows a block diagram of the basic configuration of the inventive  
11 multimedia network. In accordance with this configuration of the invention, at least one  
12 computer node and at least one video device node is distributed on the multimedia  
13 network. As discussed in more detail herein, the data transferred over the inventive  
14 multimedia network may include analog, digital, or a combination of analog and digital  
15 data. The direction of the data transfer may be bi-directional so that a device located at a  
16 computer node can send and receive data, for example, to and from a device located at a  
17 video device node.

18 In accordance with the present invention, the computer node includes a  
19 computer display local channel generating means 10, for generating a local television  
20 channel. The local television channel contains a video output signal that is generated by  
21 a computer located at the computer node. Generally, the computer display output signal  
22 is used to drive the display monitor associated with the computer. However, in  
23 accordance with the present invention, the display of the computer is converted to a  
24 local channel that is effective for allowing the displaying of video data generated by the  
25 computer on an ordinary television set located on the inventive home media network.  
26 The ordinary television may be located at a remote room in the home from the location  
27 of the computer. For example, the computer may be located in a home office or master  
28 bedroom, while the television that is used to display the computer video data is located  
29 in a family room or another bedroom.

30 The computer node also includes device control signal generating means 16 that  
31 are controllable by the computer for generating device control signals. These device  
32 control signals are transferable over the multimedia network and are effective to  
33 selectively control at least one video device located remotely from the computer on the  
34 multimedia network. The computer also includes computer control receiving means 12  
35 for receiving computer control signals transferred over the multimedia network from,  
36 for example, a user input device 18 being used to control the remotely located computer  
37 while viewing the computer generated video information on the local television.

38 The inventive multimedia network also includes one or more video device nodes  
39 at which is located, for example, a conventional VCR, DVD player, television, and/or

1 cable television set top box. The video device node includes device control signal  
2 emitting means 14 for receiving the control signals transferred over the multimedia  
3 network from the computer node.

4 The device control signal emitting means 14 emits video device control signals  
5 that are effective to control a video device located on the multimedia network remotely  
6 from the computer. Thus, the video device can be remotely controlled by the computer.  
7 The video device node also includes computer control signal generating means 15. The  
8 computer control signal generating means 15 is controllable by a user input device 18,  
9 such as a wireless keyboard or remote control, the computer control signal generating  
10 means 15 generates the computer control signals that are transferred over the whole  
11 multimedia network so that the computer can be remotely controlled in response to user  
12 input.

13 Thus, in accordance with the present invention, a multimedia network is  
14 provided that allows an ordinary television to act as a computer monitor for a computer  
15 that is located remotely from the television. The computer also can control a remote  
16 video device located where the television is located. As will be discussed in more detail  
17 herein, the inventive multimedia network effectively allows the ordinary video devices,  
18 such as set up boxes, television, and VCRs already existing in the home to become  
19 computer enabled. This feature of the multimedia network unlocks the door for many  
20 useful and novel computer assisted features, without requiring a homeowner to reinvest  
21 in expensive video devices.

22 Furthermore, the video device nodes of the inventive multimedia network can  
23 include video device local channel generating means 20 for generating a video device  
24 local television channel that contains the video output of at least one of the video devices  
25 located at the video device node. As will be discussed in more detail herein, the  
26 inventive multimedia network enables ordinary and pre-existing video devices, such as  
27 television, VCRs, and set up boxes to be used for previously impossible enhanced  
28 multimedia viewing experiences.

29 In Figure 2(a) is a block diagram showing an inventive computer-enabled VCR  
30 system. In accordance with this aspect of the invention, a conventional pre-existing  
31 VCR is controlled under the direction of an external microprocessor 22 so that the VCR  
32 is imparted with enhanced video recording and playback capabilities. An example of  
33 these enhanced recording and playback capabilities is discussed herein with reference to  
34 Figures 4(a), and (b), wherein the VCR is controlled by the microprocessor 22 to  
35 selectively record and playback information that enables a user to determine the contents  
36 recorded on the VCR tape.

37 As shown in Figure 2(a), the inventive computer-enabled VCR system includes  
38 a microprocessor 22 that has associated with it some type of storage 24 device, such as  
39 RAM, hard drive, or the like. The microprocessor 22 controls a data signal generator

1 26 that is used to generate data signals that are recordable on a VCR tape inserted in the  
2 VCR, or that are recordable on the recording medium of a video recording device. The  
3 microprocessor 22 receives input from a data signal detector 28, which receives the  
4 recorded data signals during the playback of the VCR tape. A universal remote control  
5 signal generator, such as that typically found in universal-type remote controllers such  
6 as "Four-in-One" remote control available from Radio Shack, Catalog No. 15-1911A,  
7 so that most popular makes and models of VCRs and other video devices can be easily  
8 controlled. An infra red emitter connected to the universal remote control signal  
9 generator is placed in the location of the infra red detector of the VCR so that the infra  
10 red control signals generated through the control of the microprocessor 22 can be used  
11 to control the VCR.

12 Figure 2(b) is a block diagram showing a configuration of the inventive  
13 VCR/Internet appliance. In this case, an external stand-alone VCR control sub-system,  
14 as described above with reference to Figure 2(a), may be provided, or the components  
15 described herein may be incorporated in the VCR itself. In accordance with this  
16 configuration, a microprocessor 22 is used to control the operation of a storage 24  
17 device, a modem, a video driver, and a VCR control circuit. The VCR control circuit is  
18 used to control a VCR control system, such as an ordinary VCR. The VCR's output is  
19 displayed on a TV. The video driver controlled by the microprocessor 22 enables the  
20 display of Internet content obtained through the modem. The storage 24 device is  
21 provide so that this Internet content can be cached to improve the performance of the  
22 system.

23 Figure 2(c) is a block diagram showing a multiple node wireless multimedia  
24 network in accordance with the present invention. In this case, location1 represents a  
25 computer node, and location2 and location3 represent video device nodes, as described  
26 in Figure 1. In accordance with this aspect of the invention, a wireless transceiver 32 at  
27 each node is used to transfer data between the devices and components on the  
28 multimedia network.

29 As shown in Figure 2(c), the multimedia network may be constructed of nodes  
30 that are in communication with each other through the use of radio frequency signals  
31 transmitted via wireless transceivers 32. Alternatively, as described in detail herein, the  
32 multimedia network may consist of computer, video device and device control nodes  
33 that communicate with each other over coaxial, phone line, shielded cable, electrical  
34 wiring, fiber optic, IR, or other data transfer networks or any combination thereof.

35 Figure 2(d) is a block diagram showing a DVD recorder system controlled over  
36 the inventive multimedia network in accordance with the present invention;

37 Figure 2(e) is a block diagram showing a computer-enabled DVD or random  
38 access recorder system in accordance with the present invention.

39 Figure 2(f) is a block diagram showing a DVD/RAM/Internet appliance.

1           Figure 2(g) illustrates a variety of random access memory configurations for a  
2 random access video recorder in accordance with the present invention.

3           One of the features that make the inventive system particularly useful is a  
4 content-indicating recording system for recording and displaying content-indicating  
5 information to and from a videotape or other video storage 24 medium. In accordance  
6 with this aspect of the invention, television program information is received through a  
7 computer (networked system) or microprocessor 22 (stand-alone system) from the  
8 Internet or an electronic programming guide. The program information is converted  
9 into a recordable signal (such as an audible modem signal), and transferred over the  
10 multimedia network from the computer node to the video device node. A VCR at the  
11 video device node is controlled to record the recordable signal as an information header  
12 located at the beginning of a videotape, or as described herein, as information encoded  
13 on the videotape that corresponds to data stored on the computer or other remote storage  
14 24 device. Preferably, the recordable signal is an HTML-type document, with  
15 hyperlinks that correspond to the television programs recorded on the videotape. When  
16 a videotape with the recorded information header is played back, the HTML file is  
17 uploaded from the VCR to the computer for display on a TV located at the video device  
18 node (via the computer local channel). The video recorder itself may be configured to  
19 generate the HTML display directly. The HTML document can include links to the  
20 Internet for related content relevant to the recorded show, suggestion of similar shows,  
21 etc. By activating one of the HTML's hyperlinks, the user selects a recorded TV show  
22 to watch. The computer receives the selection and controls the VCR to cue up the  
23 selected recorded TV show and begin playback. Using a determined user-profile  
24 (determined by a demographic questionnaire and/or by a data base of the TV viewing,  
25 movie renting and Internet usage habits of the household), the computer can be used to  
26 predict what shows the user might be interested in, and automatically control the VCR  
27 to record these shows. In this case, an Internet-based service can be provided that  
28 creates programming and other content suggestions that correspond with a statistical  
29 analysis of the user-profile.

30           Figure 3(a) is a block diagram of an inventive multimedia network that enables,  
31 among other things, the indicating of content recorded on a videotape. In accordance  
32 with this configuration of the inventive multimedia network, content information  
33 determining means 34 is provided for determining content-indicating information that  
34 corresponds to the content recorded on, or to be recorded on, a videotape. The content  
35 may include, for example, television programs that are selected by the user for  
36 recording through the use of an electronic programming guide or through access to an  
37 Internet website. The electronic programming guide or the Internet website will  
38 typically include a programming grid that indicates what the television programs are the  
39 are available for viewing on a cable or broadcast television system. In addition, the

1 inventive multimedia network can be used to provide for the recording of television  
2 programs based on a learned or pre-registered view profile. In the case of a pre-  
3 registered viewer profile, the user initializes the system by filling out a number of fields  
4 that correspond to television program viewing preferences. These fields are then used  
5 to determine what future television program or Internet content the particular viewer is  
6 most likely to be interested in, and the VCR recorder is appropriately controlled to  
7 record these types of television programs and/or bookmarks are generated  
8 corresponding to the Internet content. The learned viewer profile may be obtained  
9 separately or in conjunction with the registered viewer profile, by monitoring or  
10 otherwise keeping track of the television programs a viewer watches over time.

11 Thus, the content information determining means 34 obtains the content-  
12 indicating information for a particular television show, such as the show title, channel,  
13 date, time and a brief description of the show. This content-indicating information can  
14 be downloaded from the Internet, obtained from an electronic programming guide,  
15 entered in by the user or copied from a removable medium such as a floppy disk.  
16 Converting means 36 are provided for converting the detected content-indicating  
17 information into a recordable content signal. The Converting means 36 may be, for  
18 example, software running on a conventional personal computer. For example, if the  
19 content-indicating information is downloaded from the Internet, it can be easily  
20 incorporated into an HTML document that is saved as an HTML file. This HTML file  
21 can then be converted into a transmissible signal as is typically done when uploading  
22 such an HTML document to the Internet through the use of a modem. However, in  
23 this case, the HTML document is uploaded for recording on a videotape or other  
24 recording medium rather than for storage 24 on a server connected to the Internet.  
25 Generating means is provided for generating a recordable information signal for  
26 recording on the videotape. The recordable information signal includes the recordable  
27 content signal corresponding to the content-indicating information. Transferring means  
28 40 is provided for transferring the recordable information signal to a recording head of a  
29 videotape recorder. For example, the information signal can be an audio signal, such as  
30 modem-like signal that converts an HTML file into a transferable audio signal. The  
31 audio signal is put onto the multimedia network through an appropriate connection so  
32 that it can be recorded onto the VCR tape in the video recorder located at the video  
33 device node under the control of the computer located at the computer node.

34 Figure 3(b) is a block diagram of the inventive multimedia network including  
35 the inventive video recording system for recording content-indicating information on a  
36 videotape. The configurations of the inventive multimedia network shown in Figures  
37 3(a) and 3(b) also include Video device controlling means 42 for controlling the  
38 videotape recorder to record the recordable information. The Video device controlling  
39 means 42 may be, for example, a universal remote control signal generator that is

1 controllable by the computer located at the computer node of the inventive multimedia  
2 network. The VCR located at the video device node can be remotely controlled by the  
3 computer in the appropriate manner to effect the recording of the information signal.  
4 Cue information determining means 44 is provided for determining control cue  
5 information for automatically controlling a videotape recorder in accordance with the  
6 determined content-indicating information. The control cue information includes  
7 indications such as detectable tones that are recorded as part of the audio signal on the  
8 videotape to indicate control cues such "record start-header" signal, "record end-header"  
9 signal, and the like (described in more detail herein). The generating means includes  
10 recordable Cue signal generating means 46 for generating the recordable information  
11 signal including the recordable cue signal that corresponds to the control cue  
12 information. Thus, the recordable information signal includes the recordable content  
13 signal that carries the content-indicating information, and the recordable cue signal that  
14 carries the control cue information. The Video device controlling means 42 controls a  
15 device control signal generating means 16 that generates a control signal that is  
16 transferred via the Transferring means 40 over the multimedia network to a device  
17 control signal emitting means 14. For example, in the case of universal remote control  
18 signals, a dc signal may be generated under the control of the computer or  
19 microprocessor 22 through the Video device controlling means 42 and the device  
20 control signal generating means 16 (described in more detail below.) The various  
21 computer and device control signals may be generated directly as wireless rf signals, or  
22 may be converted from ir to rf signals as needed, depending on the particular  
23 configuration of the modules making up the inventive network. The control signal  
24 contains the appropriate information for controlling a particular VCR connected to the  
25 inventive multimedia network. For example, in the case of a dc signal transmitted over a  
26 hard wire network, the dc pulse information is transferred through the multimedia  
27 network and is received by the device control signal emitting means 14. The device  
28 control signal emitting means 14 emits the device control signals for automatically  
29 controlling the videotape recorder depending on the control cue information.

30 The information signal that is recorded on the videotape contains content-  
31 indicating information and control cue information so that the videotape recorder can be  
32 appropriately controlled to "upload" the content-indicating information (HTML data)  
33 back to the microprocessor 22 so that it can be detected and the content of the videotape  
34 displayed. The recordable information signal is played back and transferred by the  
35 Transferring means 40 to an information signal detecting means 68 for detecting the  
36 content-indicating information and the control cue information so that a representation  
37 of the content recorded on the videotape can be displayed, and so that the videotape  
38 recorder can be appropriately controlled. The recordable content signal and the  
39 recordable cue signal are combined through combining means 48 into the recordable



1 information signal, such as an audio signal, so that this information signal can be  
2 transferred over the inventive multimedia network from the computer or microprocessor  
3 22 to the VCR and from the VCR back to the computer or microprocessor 22. The  
4 detecting means includes means for detecting control cue information from the  
5 information signal.

6 As shown in Figure 3(c) in accordance with the present invention, a multimedia  
7 network is provided for enabling the viewing of computer-generated data on any  
8 television or audio and/or video display device connected to the multimedia network.  
9 The multimedia network may be comprised of a pre-existing system such as a hard  
10 wired coaxial television cable network. The inventive multimedia network includes a  
11 computer node at which is located a general purpose personal computer, workstation or  
12 the like, or a function-specific microprocessor 22 running software dedicated to the  
13 functions described herein. The computer node includes computer display local channel  
14 generating means for receiving the video output of the computer and generating a  
15 computer display local television channel. The computer display local television  
16 channel contains a video output signal corresponding to a computer display output  
17 signal generated by the computer at the computer node. The computer display local  
18 television channel is essentially a new television channel that can be tuned in by any  
19 video or audio device in communication with the multimedia network. This local  
20 television channel is thus effective for allowing the displaying of video data generated  
21 by the computer on a television located on the multimedia network remotely from the  
22 computer.

23 The computer node also includes device control signal generating means 16  
24 controllable by the computer for generating device control signals transferable over the  
25 multimedia network and effective to selectively control at least one video device, such  
26 as a VCR, TV or set top box, located on the multimedia network remotely from the  
27 computer. The computer node further includes computer control signal receiving means  
28 12 for receiving computer control signals transferred over the multimedia network.  
29 These computer control signals allow the computer located at the computer node to be  
30 controlled by a user located remotely at a video device node. The video device node  
31 includes device control signal emitting means 14 for receiving the device control signals  
32 and for emitting video device control signals effective for controlling the video device  
33 located on the multimedia network remotely from the computer. Thus, the video  
34 device can be remotely controlled by the computer. The video device node further  
35 includes computer control signal generating means 15 controllable by a user input  
36 device 18 for generating computer control signals transferable over the multimedia  
37 network. The computer control signals are generated in response to user input received  
38 from, preferably, a wireless input device such as an IR or rf remote control or  
39 keyboard. The user input received at the device node is converted, if necessary, into

1 signals that are carried via the multimedia network to the computer control signal  
2 receiving means 12 located at the computer node. The computer control signal  
3 receiving means 12 is in communication with the computer (such as through the  
4 keyboard or mouse port) so that the computer can be remotely controlled in response to  
5 the user input.

6 In accordance with the present invention, video device local channel generating  
7 means 20 generates a video device local television channel containing the video  
8 (including audio) output signal of the at least one video device located at a video device  
9 node on the multimedia network. The multimedia network can include multiple video  
10 devices at each of multiple video device nodes. For example, a satellite set top box in  
11 the living room of the house can be provided at one video device node, and its output  
12 put onto the multimedia network as a new television channel that can be tuned in by a  
13 television located in another room at another video device node. For example, the  
14 control of the satellite set top box is accomplished via control signals that originate as IR  
15 pulsed from a user-controlled remote control at the video device node of the television.  
16 These control signals are converted into dc signals and get passed via the coaxial  
17 network to the computer node where they are converted (if necessary) into signals that  
18 control the computer, and then, under the control of the computer, appropriate control  
19 signals are converted into dc signal and passed (again on the network) to the video  
20 device node of the satellite set top box where a device control signal emitter converts the  
21 signals again (this time into IR) and emits the control signals necessary to appropriately  
22 control the satellite set top box according to the user's instructions. Or, the IR signals  
23 can be converted into wireless rf signals for transmission.

24 To enable enhanced functionality, such as in-house intercom and speaker phone  
25 systems, voice activation and user identification, etc., a microphone input 50 is located  
26 at a location on the multimedia network for receiving microphone signals. The input of  
27 the microphone signals at a particular location (such as at a computer or device node, or  
28 anywhere connected to the multimedia network) is selected by Selecting means, such as  
29 a relay circuit in the case of a stand-alone device or through software control in the case  
30 of a microprocessor 22 or computer. Adding means 54, which may simply be a  
31 connection to the network controlled through the selecting means, adds the selected  
32 input of the microphone signals to the multimedia network. By this construction, a user  
33 can communicate through spoken words over the multimedia network. In the case of  
34 an in-home intercom system, means are provided for generating audible sound signals  
35 corresponding to the selected input of the microphone signals at a location on the  
36 multimedia network remote from the location of the at least one microphone input 50  
37 receiving the selected input of the microphone signals. For example, the microphone  
38 input 50 that includes the voice of a user in one room can be carried over the multimedia  
39 network to the speakers of a television at a device node in another room where a second

1 user is located. The computer at the computer node can be used to control the various  
2 device to enable the two way communication between users at different rooms of a  
3 house that includes the inventive multimedia network.

4 To enable an in-home video intercom system, a camera input 56 is provided  
5 located at a location on the multimedia network for receiving video camera signals. The  
6 input of the video camera signals is selected by selecting means, and at least one of the  
7 computer display local television channel generating means and the video device local  
8 television channel generating means includes means for including the selected input of  
9 the microphone signals and the selected input of the video camera signals in the  
10 corresponding computer display local television channel and the video device local  
11 television channel. Using this construction, a two-way in-home video intercom is  
12 provided that utilizes the televisions and coaxial cable television network already in  
13 place in many homes. Of course, as with many of the embodiments shown herein, the  
14 transmission of video, audio, control signals and data can be accomplished via wireless  
15 transmissions, through the electrical wiring, phone lines, or other wired network, or  
16 through a combination of any of these signal transmission mechanisms.

17 A further enhancement feature of the inventive multimedia network is a system  
18 for providing a speaker phone system usable through-out the house. In this case,  
19 means is provided for connecting the selected input of the microphone signals to a pre-  
20 existing telephone system, and the speakers of a device located at or near the location of  
21 the microphone can be used to provide the audio of a phone conversation. To let the  
22 user know a phone call is coming in, means for notifying the existence of a received  
23 telephone call on at least one display connected to the multimedia system. For example,  
24 when a phone call is detected on the phone system, the computer at the computer node  
25 can tune its television software to the same channel as the television that the user is  
26 watching, and then generate a "phone call" message that is displayed along with the  
27 television program. The computer display local television channel includes the  
28 television program and the phone call message. The television is controlled via the  
29 computer to tune into the computer display local television channel so that the phone  
30 message is displayed on the television along with the TV show that the user is currently  
31 viewing. Means are provided for answering the received telephone call and selecting  
32 the input of the microphone signals received by the Microphone input 50. For example,  
33 a voice command or a button on the remote control can be used to answer the call. To  
34 further enhance the system, a caller-ID for determining a telephone number of a  
35 received telephone call can be included in the system along with means for displaying  
36 the determined telephone number on the television. For example, the phone number can  
37 be included along with the phone call message.

38 In a voice-recognition configuration of the inventive multimedia network, the  
39 system continuously "listens" via distributed microphones for a particular start-system

1 word or phrase, such as a name given to the system. A separate dedicated  
2 microprocessor 22 can be provided (for example, at each node or just a single one at  
3 either a particular computer or device node) that "listens" for this start-system phrase.  
4 Once received, the address of the receiving node is used by an addressable controller to  
5 locate the source of the start-system input. Alternatively, the input of each of the  
6 distributed microphones can be fed to a central or main computer or microprocessor 22  
7 that awaits the reception of the start-system input. As another alternative, each  
8 microphone can be configured to include an identifying signal such as a pulse or  
9 frequency so that the location of the user can be determined.

10 The start-system input can be detected using voice recognition software running  
11 in the background of the main computer, or running on the dedicated microprocessor  
12 22. Once the start-system input is received, the computer knows (via software  
13 instructions) that the next voice command is directed at it, and is not just part of the  
14 ambient conversation, television or noises. To make the system more efficient at  
15 recognizing the start-system input, the voice pattern of the particular user or users of the  
16 system (members of the household) can be learned through well-know voice  
17 recognition techniques so that if, for example, a television program produces the same  
18 words as the start-input, it will not cause the computer to anticipate a voice command.  
19 Alternatively, the system can be configured through software (or "hard wired") so that  
20 the start-system input must be followed by predetermined voice commands within a  
21 specified time duration, or else the computer will ignore the start-system input.

22 As an example, the system can be configured so that the following start-system  
23 input: "hello computer" followed within a 2 second duration by "display phone list",  
24 results in the following actions: 1) upon receiving the start-system input "hello  
25 computer" at a particular device node, the address of the device node where the  
26 microphone that inputs the start-system input is located is received by the addressable  
27 controller and the location of the user is determined; 2) the computer at the computer  
28 node is "told" (via software instructions) that if a recognized voice command is received  
29 within 2 seconds, it should perform the requested command; 3) since the recognized  
30 voice command "display phone list" is received within the allowed duration, the  
31 computer will perform the requested command; 4) to perform the requested command,  
32 the computer in this example will open a "phone list" file stored on its hard drive, and  
33 then make sure that the television or display at the particular device node is set to  
34 display the computer video output (that is, if it is tuned to the computer display local  
35 channel). If another recognized voice command inputted from the same microphone is  
36 received within an allowed-for duration (in this case, perhaps 15 seconds to allow the  
37 phone list to be displayed on the user's television and the user to peruse it), then that  
38 command is performed. For example, after perusing the phone list the user might issue  
39 the recognized voice command "call Jeff G.", which results in the computer finding Jeff

1 G's phone number from the phone list, connecting the microphone at the user's location  
2 to the home phone system and dialing the number. If the 15 seconds passes without a  
3 command, the computer can be programmed to ask (via synthesized voice outputted to  
4 the television speakers, "would you like me to dial a number?." If an appropriate voice  
5 command is received, the computer will perform the requested operation. If not, the  
6 system must be re-started by the start-system input ("hello computer").

7 To enable the exchange of data between the user and the Internet at any  
8 television connected to the inventive multimedia network, means is provided for  
9 connecting to the Internet and downloading Internet data. For example, a modem can  
10 be included in a device located at one of the computer or video device nodes. Internet  
11 video output signal generating means 58 receives the Internet data and generates an  
12 Internet video signal dependent thereon (along the lines of the recently introduced  
13 product called WebTV).

14 Recently, relatively high speed cable modems have become available that allow  
15 set top boxes, computers or other devices to connect to the Internet via the cable  
16 television network. However, in the conventional configuration used with these cable  
17 modems, the Internet is displayed only on the device connected to it. For example, in  
18 the case of a set top box, computer or Internet appliance cable modem connection, the  
19 video output containing the Internet web pages is displayed only on a single connected  
20 display device. Conventionally, a viewer could only control the access to the Internet  
21 and view the downloaded web pages from the connected display device. However, in  
22 accordance with the present invention, the device local channel generating means  
23 includes means for generating the video device local television signal containing the  
24 Internet video output signal data. Thus, this local television channel can be tuned into  
25 by any television or display device connected to the inventive multimedia network.  
26 Further, the access to the Internet can be controlled from the location of the television  
27 through the use of control signal generating and detecting means as described herein.

28 The computer at the computer node of the inventive multimedia network can  
29 have access to the Internet and other on-line networks via means for connecting the  
30 computer to the Internet and downloading Internet data. For example, the computer  
31 may be configured with an internal modem, and/or an external modem may be used.  
32 The internal modem may be used for a connection to the Internet via the telephone lines,  
33 and, if provided, the external modem may be a cable or wireless modem, or other  
34 Internet data transfer device. The computer display local channel generating means  
35 includes means for generating the computer display local television signal containing the  
36 Internet video output signal data. In a basic version, the Internet video output is just the  
37 computer display output that normally is displayed on a computer monitor in direct  
38 connection with the computer. However, in accordance with the inventive multimedia  
39 network the computer display output is converted into a local television channel so that

1 any display connected to the network can tune in the channel and display the Internet  
2 video output.

3 In the case of a dual modem system, two users located at two different nodes of  
4 the inventive multimedia network can be accommodated with an individual connection  
5 to the Internet. If both connections are made through the same computer, the computer  
6 can be configured and controlled so that it can drive multiple monitors. Each monitor  
7 output can be converted into its own computer display local television channel, and each  
8 user tunes the TV or display device located at their particular node to one of the  
9 channels. The computer can be controlled in a multitasking manner so that each user is  
10 able to access the Internet (or use, for example, word processing software or other  
11 applications) on an individualized basis. The addressability of the inventive system  
12 will allow the detection of computer control signals and appropriate control of the  
13 computer depending on the desires of each user. In this case, the computer operates  
14 much like a mainframe system, with the display and input device at the nodes acting as  
15 "dummy" terminal. As is shown in Figures 3(k) and 3(l), a single modem or internet  
16 connection can be used by two or more users of the inventive multimedia network. In  
17 this case, a single modem and a single computer are used to connect with an Internet  
18 service provider. The computer is set to display on multiple monitors, allowing  
19 separate local channels to be generated for each monitor output. Two or more users  
20 each access the local channel (or the computer monitor located at the computer) to view  
21 a respective monitor output. If two or more users are using the single modem/computer  
22 for access to the Internet, each of their respective monitors will show a different web  
23 browser window. The web browser window could be generated through a single web  
24 browser application, or two different web browser applications can be running  
25 simultaneously on the single computer.

26 The present invention provides a method for indicating the content recorded on a  
27 videotape and also provides a video recording system for recording content-indicating  
28 information on a videotape. The videotape content-indicating features can be included  
29 in the inventive multimedia network system, enabling a host of useful enhancement to  
30 the multimedia viewing experience. For example, the content of television programs  
31 recorded on a videotape can be determined from information stored on the videotape  
32 itself. This information is generated, in accordance with a preferred embodiment, by a  
33 computer located at a computer node and transferred over the multimedia network, such  
34 as a pre-existing coaxial cable television network, for recording on a VCR located at a  
35 video device node. The VCR is controlled via the computer in the manner described  
36 herein so that the content-indicating information is included, along with control cue  
37 signals, on the videotape. To determine the content of the videotape, the VCR is  
38 controlled via the computer to playback the content-indicating information in accordance  
39 with the control cue signals (which mark, among other things, the beginning and

1 ending of the recorded information signal that includes the content-indicating  
2 information). In the preferred embodiment, the content-indicating information consists  
3 of HTML code that includes hyperlinks for controlling the VCR to cue-up and playback  
4 a selected recorded television show. The HTML code can be automatically generated  
5 by inserting specific instructional code (such as fast forward time, play time, rewind  
6 time, tape identification data, recorded content identification data, related links, etc.)  
7 into a HTML document template. Further, portions the HTML document can be  
8 downloaded from the Internet. For example, a website can contain the particulars of a  
9 specific show that is to be or that has been recorded. This website may include  
10 identifying content that is specifically formatted for inclusion with the content-indicating  
11 HTML document. This identifying content (which may be text, graphics, java code,  
12 etc.) can be downloaded from the internet when a show is selected for recording. This  
13 identifying content may then be incorporated into the HTML document, or the  
14 appropriate control signal information can be appended to an HTML document  
15 generated in accordance with the identifying content, so that the VCR or video recorder  
16 can be appropriately controlled to cue up the recorded show.

17 In accordance with the inventive method for indicating the content recorded on a  
18 videotape, the content-indicating information is first determined corresponding to the  
19 content recorded on, or to be recorded on, a videotape or video recorder. The  
20 determined content-indicating information is converted into a recordable content signal,  
21 and a recordable information signal is generated for recording on the videotape. The  
22 recordable information signal includes the recordable content signal corresponding to  
23 the content-indicating information. The recordable information signal is transferred,  
24 either directly or over the inventive multimedia network, to a recording head of the  
25 videotape recorder. The videotape recorder is controlled to record the recordable  
26 information.

27 In the case of a preferred embodiment of the inventive multimedia network, the  
28 device control signal generating means 16 is a universal remote control signal generator  
29 that has been initialized to control the VCR located at the video device node. If  
30 necessary, the output of the universal remote control signal generator is converted from  
31 IR to dc or rf signals. The universal remote control signal generator is controlled by the  
32 computer at the computer node and used to generate dc device control signals. The dc  
33 device control signals are transmitted from the computer node to the video device node  
34 over the coaxial cable television network. At the device node, the dc control signals are  
35 received by the device control signal emitting means 14 and used to drive an IR emitter.  
36 The IR emitter is placed so that the IR pulses are received by the IR detector of the  
37 VCR. Usually, the IR detector of the VCR is provided by the manufacturer so that the  
38 VCR can be controlled by the user via a hand-held remote controller. In accordance

1 with the present invention, this same remote control system of a conventional VCR is  
2 utilized so that a remotely located computer can control the VCR.

3 In order to appropriately control the VCR during the later play-back of the  
4 content-indicating signal and recorded content, control cue information is determined.  
5 The control cue information may be an audible or inaudible tone signal that is recordable  
6 on the VCR tape. The control cue information is used for automatically controlling the  
7 videotape recorder. The recordable information signal is generated to include a  
8 recordable control cue signal corresponding to the control cue information. This  
9 recordable information signal thus includes both the content-indicating signal and the  
10 control cue signal.

11 In the preferred embodiment of the present invention, the content-indicating  
12 information comprises HTML data. This HTML data corresponds to a web-like page  
13 that is viewable by ordinary Internet browser software, or by custom software. The  
14 web-like page includes hyperlinks to related Internet, intercast or removable media  
15 content that pertains to the television programs or other content recorded on the  
16 videotape. The hyperlinks are also used to provide user-input for the control of the  
17 video recorder via the computer and inventive multimedia network. For example, the  
18 hyperlink for a recorded TV program, program1, includes information that corresponds  
19 to determining the location on the videotape of the beginning and ending of program1.  
20 For example, the information may be the time it takes to fast forward to the beginning  
21 of the program from the start of the tape (or other determined location on the tape), the  
22 duration or counter-value of program1, the counter-value of the beginning and ending  
23 of program1, a certain tone frequency or tone pulse that indicates the beginning and/or  
24 ending of program1, a video signal that indicates the beginning and/or ending of  
25 program1, etc.

26 Once the videotape has been recorded to include the information signal, the  
27 content recorder on it can be determined and displayed for the user. The display can be  
28 via the inventive multimedia network in which case the computer display local television  
29 channel is tuned in by the TV (perhaps under the control of the computer in response to  
30 user-input) and the web-like page display from the computer video output is shown on  
31 the television. In this case, the video recorder is controlled to playback the recordable  
32 information signal including the recordable content signal previously recorded on it.  
33 The recordable information signal is transferred to an information signal detector and  
34 the content-indicating information is detected from the recordable content signal so that  
35 a representation of the content of television programs recorded on the videotape can be  
36 displayed. In a preferred embodiment, the HTML data is transferred between the  
37 computer and VCR using an appropriately controlled modem. Alternatively, the spk  
38 and mic ports (or other data ports) of the computer can be used to input and output the  
39 HTML data for recording and playback on the VCR. Since the recordable information



1 signal includes the recordable control cue signal, the control cue information is detected  
2 (by detecting the tone frequency, pulse, video data or whatever the control cue  
3 information is) for controlling the videotape recorder. The videotape recorder is  
4 automatically controlled depending on the control cue information. For example, the  
5 audio-in capabilities of a conventional computer can be used to receive the recorded  
6 information signal. Frequency filtering software can be used detect the particular  
7 frequency and/or pulse data of the control cue information. Alternatively, an external  
8 audio filter circuit can be used, which detects the particular frequency and/or pulse data.

9 The HTML document can also be recorded as a video image stored on the  
10 videotape. Each of the recorded shows can be designated with a particular page that is  
11 stored as a frame, or multiple frames, of video data. The recorded content on the  
12 videotape can be ascertained by scrolling through these frames, using for example, the  
13 slow motion or frame by frame play capabilities of the VCR. The computer can keep  
14 track of which page is being displayed, and in accordance with the content-indicating  
15 information and information for the particular VCR model such as its fast forward tape  
16 speed, knows how to control the VCR to cue up the selected program.

17 In accordance with the present invention, a video recording system for  
18 recording content-indicating information on a videotape is provided. The inventive  
19 system includes content determining means, such as computer software or a  
20 microprocessor 22 circuit for controlling the connecting, selecting and downloading of  
21 information, such as an HTML page containing television programming information  
22 from a network, such as the Internet, or from an electronic programming guide from a  
23 network, such as a cable television network, or from a removable medium such as a  
24 floppy disk. The content determining means may also be configured for allowing a user  
25 to manually input the determined content, to allow for, for example, the determining of  
26 content pertaining to a camcorder recording. The content determining means determines  
27 content-indicating information corresponding to the content recorded on or to be  
28 recorded on a videotape. For example, in the case of an HTML page, a user selects  
29 from the downloaded HTML page data about a particular television show that is to be  
30 recorded. This data determines such content-indicating information as a show  
31 description, date, channel and time that it will be aired.

32 Converting means 36 converts the determined content-indicating information into  
33 recordable content data. The converting means 36 may be, for example, a computer  
34 modem, or computer software or a microprocessor 22 circuit that converts the HTML  
35 page data into recordable content data. The recordable content data may be an audible  
36 signal that can be outputted from a speaker port, and/or a video signal that can be  
37 outputted from a video port. The recordable content data can be converted into any  
38 analog or digital data that can be recorded on a videotape. Stated otherwise, the  
39 converting means 36 takes the HTML page data (which can be viewed using browser

1 software, for example, on a computer monitor) and converts it into data that can be  
2 recorded on a videotape. In the case of the HTML page data, the Converting means 36  
3 may be a microprocessor 22 circuit or software controlling a computer to parse or select  
4 the content-indicating information and creating an HTML page that contains the content-  
5 indicating information, the recordable content data is included in this created HTML  
6 page.

7       Generating means generates a recordable information signal for recording on the  
8 videotape. The generating means includes content signal generating means for  
9 generating a recordable content signal corresponding to the recordable content data.  
10 The generating means may be, for example, a microprocessor 22 circuit or software for  
11 controlling a computer to generate an audible modem-like signal that contains the  
12 created HTML page, in the case of a computer, the computer's speaker port and sound  
13 capabilities can be used to generate the recordable information signal, or a conventional  
14 modem or modem-like device can be controlled by a microprocessor 22 circuit or  
15 computer so that the created HTML page is modulated into a recordable signal.

16       Transferring means 40 transfers the recordable information signal to a videotape  
17 recorder. In the case of a home coaxial cable television network, the transferring means  
18 40 includes a connection to the coaxial network. In the case of, for example, of the  
19 wireless transfer of the recordable information signal, the transferring means 40  
20 includes a rf or IR transmitter. If necessary for transferring the data, the generated  
21 recordable information signal may have to be converted into a suitable signal form, such  
22 as an rf signal, that can be transmitted wirelessly from the transmitter to a remote  
23 receiver.

24       Video device controlling means 42 controls the videotape recorder to record the  
25 recordable information signal. The video device controlling means 42 may be a  
26 microprocessor 22 circuit or software controlling a computer to generate the appropriate  
27 control signals that effect the recording via the video recorder. As described herein,  
28 device control signal generating means 16 and device control signal emitting means 14  
29 can be utilized to generate the appropriate control signals that are transferred over the  
30 multimedia network (for example as wireless rf signals or dc signals that can be  
31 transferred over the coaxial network) and then emitted as IR remote control signals that  
32 control the videotape recorder to record the recordable information signal.

33       Cue determining means controls control cue information for automatically  
34 controlling a videotape recorder. A microprocessor 22 circuit or software controlling a  
35 computer can be utilized to determine the control cue information. The control cue  
36 information, as described in the flow charts below, is used to determine where on the  
37 videotape the program content and the content-indicating information is located. The  
38 generating means includes means for generating the recordable information signal  
39 including cue signal generating means 46 for generating a recordable control cue signal

1 corresponding to the control cue information. The recordable control cue signal may  
2 be, for example tones or video data can be recorded on the videotape and later detected  
3 so that the location on the tape of the program content and the content-indicating  
4 information can be determined during playback. The cue signal generating means 46  
5 may be, for example, a tone signal generator (such as a modem or speaker driving  
6 circuit) or video signal generator (such as a video driver circuit) that is controlled by a  
7 microprocessor 22 circuit or software controlling a computer so that the appropriate  
8 control cue signals are generated at the appropriate times. Combining means 48  
9 combines the recordable content signal with the recordable cue signal to generate the  
10 recordable information signal. The Combining means 48 may be, for example, a  
11 microprocessor 22 circuit or software for controlling a computer so that the recordable  
12 content signal is generated with the appropriate control cue signal.

13 The video device controlling means 42 includes playback controlling means for  
14 controlling the video recorder to playback the recordable information signal including  
15 the recordable content signal previously recorded on the videotape. Detecting means  
16 detects the content-indicating information from the recordable information signal so that  
17 an indication of the recorded content of the videotape can be displayed. The  
18 transferring means 40 includes means for transferring the recordable information signal  
19 to an Information signal detecting means 68.

20 The detecting means includes means for detecting control cue information from  
21 the recordable information signal. For example, a frequency filter (either hardware,  
22 software or both) may be utilized to determine the specific tone or video frequency of  
23 the recorded control cue signal. Device control signal emitting means 14 emits device  
24 control signals for automatically controlling the videotape recorder depending on the  
25 control cue information under the control of the computer.

26 Figure 3(d) is a block diagram illustrating the connecting through a  
27 communications network such as the Internet or telephone lines connection to another  
28 multimedia network of the inventive multimedia network shown in Figure 3(c), and  
29 showing a video telephone conversation between a user located at the multimedia  
30 network shown in Figure 3(c) with another user located at the other multimedia  
31 network. The inventive multimedia network can be connected over the Internet or via  
32 some other network connection to another multimedia network. Thus, a videophone  
33 system can be configured that allows two users in separate houses down the block or  
34 around the world to take part in a video conversation. The data carried over the local  
35 television channels can be analog or digital, and since the coaxial cable is capable of  
36 transmitting data at frequencies above and below those of the television spectrum, the  
37 coaxial cable network can be used to carry analog or digital data that is not necessarily a  
38 local television channel.

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1 As shown in Figure 3(d), the existence of a user in the vicinity of one of the  
2 network nodes can be determined through a user sensor. The user sensor may include  
3 a physical motion sensor, an image motion sensor (for use with the CCD camera), a  
4 sound sensor (which can use the output of the microphone), an ir sensor (which may  
5 utilize the components of the ir signal detector), an ultrasonic sensor, or the like. In any  
6 of the embodiments shown herein, such a user sensor can be available to detect when  
7 and where a user of the inventive network is located. Further, upon detection of a user,  
8 the computer can be used to generate a question (via audibly or visually displayed  
9 information) requesting the user to identify himself or herself. The computer can then  
10 set various user-preferences for operating the various devices controlled by it to that  
11 particular user. Thus, for example, when an alert event occurs (described below), the  
12 inventive system will be able to determine the location of the user for which the alert  
13 message is being generated. The closest display (television, stereo, speakers, phone)  
14 relative to the user can be determined and use to provide the user with the alert message.  
15 Alternatively, the personal locators shown and described herein can be utilized to  
16 determine who, when and where a user is. The CCD camera can also be utilized to  
17 determine the existence and the identify of a user through an image recognition system.  
18 In this case, the image recognition system is initialized by capturing video graphic data  
19 of each particular registered user of the network. When a user first come into the view  
20 of the CCD camera at one of the network nodes, this video graphic data is used to  
21 determine the identity of that user. If the system fails to determine the identity of the  
22 user, then it can be set to request the user to identify himself or herself. Similarly, the  
23 voice pattern of the users registered with the system can be used for user-identification  
24 purposes.

25 Figure 3(e) is a block diagram showing a mixed network system for connecting  
26 various nodes of the inventive multimedia network, including a connection between a  
27 computer node and a first device node via data transferred through a home electrical  
28 wiring network and a connection between the second device node and the first device  
29 node via a home co-axial cable connection. In this configuration, the computer can be  
30 located at a computer node in a room in the house that does not have a pre-wired coaxial  
31 connection. The computer receives a television video signal via a bi-directional home  
32 electrical wiring signal Transferring means 40 that allows video and audio signals (as  
33 well as control signals and data) to be transmitted over the existing home electrical  
34 wiring. At at least one video device node, bi-directional home electrical wiring signal  
35 Transferring means 40 are also provided for transferring video and audio, as well as  
36 control signals and data, to and from the video device node over the home electrical  
37 wiring. Also at this video device node is a bi-directional home coaxial wiring signal  
38 Transferring means 40, for transferring video and audio, as well as control signals and  
39 data, to and from the video device node over the home coaxial network. Signal transfer

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1 bridging means 70 is provided in communication with both the bi-directional home  
2 coaxial wiring signal Transferring means 40 and the bi-directional home electrical  
3 wiring signal Transferring means 40 at this video device node. The Signal transfer  
4 bridging means 70 allows the audio, video, control and data signals to flow between  
5 the home electrical wiring and the home coaxial wiring. By this configuration, the  
6 computer node is able to communicate video, audio, control and data signals with any  
7 appropriate device connected to the home coaxial network, even though the computer  
8 node is not directly connected to the coaxial network. Also, any device that is can be  
9 connected to the home electrical wiring can be in communication with any device that is  
10 connected with the home coaxial wiring. Depending on the available wiring, the signal  
11 transfer bridging means 70 may be effective for transferring signals between any  
12 combination of electrical wiring, phone lines, wireless transceiver 32, co-axial cable or  
13 other wired network. In any case, the signal transfer bridging means 70 allows devices  
14 to have access to a indirect network connection with the other devices on the network.

15 To further simplify the construction and operation of the inventive multimedia  
16 network, fixed carrier frequencies can be utilized for carrying locally generated audio  
17 and video content. The fixed carrier frequencies can be outside the range allotted for  
18 television signals and thus prevent any need for selection, filtering out, or removal of  
19 content from the television channels that are available from any particular cable  
20 television provider. Further, since only a limited number of carrier frequencies will be  
21 needed, a simple tuner can be provided for tuning in the local content channels. In  
22 addition, the centralized computer control of the system will be greatly simplified, since  
23 the local content channels will have to be received and tuned in by a device that is  
24 specifically built to work with the inventive multimedia network.

25 As an example of a simplified system, a number of fixed audio and/or video  
26 channels are generated by the computer and injected onto the home electrical wiring (or  
27 phone line or coaxial, etc.) network. Each device node includes a frequency filter that  
28 only allows one of the fixed channels carrier frequency to pass. This specific fixed  
29 channel is only receivable by one receiving device located on the network. Thus, to  
30 control the content viewed, for example, at a television located at a specific device node,  
31 the computer controls the content carried on the frequency that is accessible only at that  
32 specific node. The receiving device converts the audio and video content carried on the  
33 fixed channel into a typically used TV channel, such as channel 3 or 4, that is provided  
34 to the TV, VCR or set top box via a coaxial connection (as is typically done with  
35 conventional VCRs and set top boxes). Alternatively, the receiving device converts the  
36 audio and video content carried on the fixed channel into a conventional audio-out and  
37 video-out signals that can be inputted to a VCR or TV through, for example, an RCA  
38 jack or S-Video connection.

1       The control signals can be in the form of voice recognition (speech), and the  
2 speaker phone components described herein utilized to inject the microphone or audio  
3 input on the inventive multimedia network. A wireless connection can be made with  
4 one or more speaker channels so that stereo or surround sound acoustics can be easily  
5 obtained without running a lot of speaker wires.

6       Also, a series of audio-only channels can be generated by the computer and  
7 injected onto the inventive multimedia network. These audio frequencies can be in the  
8 frequency range that is tunable by, for example, any conventional FM radio. These  
9 audio-only channels can be used, for example, to carry streaming audio content from  
10 the Internet to any room that has a speaker in it. The audio channels can alternatively be  
11 of a frequency that is not typically used for FM radio or television signals, and a  
12 dedicated tuner can be provided at the nodes to tune in the computer-generated audio  
13 signal. The audio-only signals will require component circuitry that is less complicated  
14 and expensive to manufacture, as compared with the audio/video carrying local  
15 channels. These audio-only channels can be used to enable the telephone, music, radio,  
16 intercom, etc., functionality of the inventive multimedia network described herein.  
17 Further, these audio-only channels are particularly useful in connecting the wireless or  
18 other non-coaxial network-connected nodes since the cost of the circuitry infrastructure  
19 needed for transmitting audio only signals is considerably less complicated and costly  
20 as compared with video and audio signals.

21       Further, simple LCD or LED display devices can be used to indicate the  
22 television channel, Internet streaming audio channel, telephone caller id and number,  
23 volume, etc. These display devices can be controlled by simple control signals  
24 generated by the centralized computer and carried over the wired or wireless  
25 transmission network work connection.

26       Figure 3(f) shows an example of a relatively less complex wireless  
27 configuration of the inventive multimedia network. In this case, a transceiver 32 is  
28 connected with the microphone and speaker ports of a conventional computer of a  
29 computer node located, in this example, in the bedroom. The transceiver 32 may,  
30 alternatively or additionally, be connected to other communication ports or may be an  
31 internal add-on card or even consist of components directly connected to the computer  
32 motherboard. A device node consisting of a VCR and television is located remotely  
33 from the computer, in this example, in the living room. The device node includes a  
34 transceiver 32 unit that is connected with the audio ports of the VCR. The transceiver  
35 32 unit may, alternatively or additionally, be connected to coaxial connections or RCA-  
36 type jacks of the television and, if present, with a set top box. In this basic  
37 configuration, the transceiver 32 unit is provided for receiving remote control signals  
38 from a remote control unit. In this example, the remote control unit includes a

1 microphone for allowing user-generated voice input to be used as control signals in  
2 controlling the devices and computer(s) on the inventive multimedia network.

3 As shown in Figure 3(g), the buttons of the computer are manually controlled  
4 by the user to generate either a specific rf frequency, tone frequency or rf or IR pulse  
5 train that are used as control signals. If tone frequencies are used as control signals, the  
6 tone frequencies generated by remote control unit(s) and/or the transceiver 32 unit(s) are  
7 preferably beyond the range of human hearing. The transceiver 32 units located at the  
8 device node and/or at the computer node receive the remote control generated control  
9 signals.

10 Figure 3(h) shows the basic circuit components of this configuration of the  
11 inventive multimedia system for allowing the control of a computer from a remote  
12 location and the computer control of remotely located device as described herein. In  
13 accordance with this aspect of the invention, an effective voice activation control system  
14 is enabled, since the source of the voice signals, the user, is close to the microphone  
15 during use of the remote control unit. The voice recognition module may be disposed  
16 within the remote control unit. The set top box or computer transceiver 32 unit may  
17 receive voice and control signals via a wireless transmission from the remote controller  
18 (or from the remote controller to the set top box transceiver 32 unit to the computer  
19 transceiver 32 unit) for voice recognition and control signal purposes.

20 Figure 3(i) is a block diagram of an embodiment of the inventive multimedia  
21 network having a computer node with multiple TV tuners. The multiple TV tuners may  
22 be incorporated onto individual add-on cards, provided directly on the computer  
23 motherboard, or provided as stand-alone external units. Further, in accordance with the  
24 present invention, a TV tuner card can be provided having two or more TV tuners  
25 incorporated thereon. Each TV tuner can be capable of tuning in the same or different  
26 TV channels for display as a multiple screen display on a single TV or computer  
27 monitor, or as a separate screen displayed on separate TVs (via separate local channels)  
28 and/or separate monitors. In this configuration, a manual user selectable local channel  
29 Frequency selection means 74 is provided for assigning the local channels containing  
30 the computer video output and the device video output in a manually defined manner.

31 Figure 3(j) is a flow chart showing the initialization of the multimedia network  
32 configured as shown in Figure 3(i). In this case, the user installs the system modules at  
33 the computer node(s) and device node(s) throughout the house. The user then  
34 determines which TV channels are available for carrying the local computer channel(s)  
35 and the local device channel(s). The user then selects an available channel for each  
36 node using a manual local channel frequency selection switch that sets a local channel  
37 Frequency selection means 74 to the user determined local channel. The computer  
38 video local channel generator is thus set to output the local video and/or audio  
39 information generated by the computer or device at a carrier frequency that is manually

1 chosen by the user. A separate microprocessor 22 unit may be provided for  
2 automatically detecting and assigning the available channels to the computer(s) and  
3 device(s) connected to the inventive multimedia network. The software initialization  
4 routine is run on the computer where the software prompts the user to input the selected  
5 channels and the corresponding node information so that the computer "knows" which  
6 channel is assigned to the output of which computer or device connected to the  
7 inventive multimedia network.

8       Figure 3(k) is a block diagram showing an embodiment of the inventive  
9 multimedia network configured for allowing multiple simultaneous users of a single  
10 computer with separate computer generated video information displayed on three  
11 remotely located televisions or other display devices connected to the inventive  
12 multimedia network. In accordance with this aspect of the present invention, a single  
13 computer can be used to display video and/or graphics (word processor documents,  
14 web pages, schedules, spreadsheets, multimedia displays, etc.) simultaneously on two  
15 or more display devices. For example, a user located in the bedroom (TV1) can view a  
16 web page using a conventional web browser via a monitor1 local television channel.  
17 While viewing the web page, the first user also has a television program and a video  
18 intercom conversation displayed in PIP format. In another bedroom (TV2) as second  
19 user works on a word processing document while viewing a child monitor camera  
20 output along with a TV program in PIP format. The TV program in this case happens  
21 to be the same show as the child are watching on so the parent can monitor the  
22 children's viewing habits. The determination of which show the children are watching  
23 is done by detecting which channel the children's TV is switched to by detecting the  
24 control signals (with computer generated or remote control generated) used to control  
25 the children's TV, VCR or cable set top box.

26       In the living room (TV3), the children are viewing the television program along  
27 with its associated web page. The parent in the bedroom can also switch to the same  
28 TV channel as the children are viewing at any time so that anything that the children are  
29 viewing is monitored by the parent.

30       Figure 3(l) is a flow chart for enabling multiple simultaneous users of a single  
31 computer with separate computer generated video information displayed on three  
32 remotely located televisions or other display devices connected to the inventive  
33 multimedia network.

34       Figure 3(m) is a block diagram of the inventive multimedia network having a  
35 device remote control signal detector and a device status detector for enabling the  
36 computer to determine the status of a device, such as its on/off state, and the operation  
37 of the device, such as remote controlled channel selection, for a device connected with  
38 the inventive multimedia network. A Light detector 76, consisting of a photodiode, can  
39 be adhered to the surface of the TV screen and/or an acoustic detector can be positioned



1 near one of the TV speakers, or, if available, connected to a spk out jack of the TV, or  
2 stereo. As described below, some of the features of the inventive multimedia network  
3 work best if the on-off state of the TV(s) can be determined. Another way to determine  
4 the on-off state of the TV is to keep track of the control signals received by the TV  
5 (either computer generated or generated by a user controlled remote controller. In this  
6 case, the circuitry described below with reference to Figures 41(a) - 41(b) can be  
7 employed.

8 Figure 3(n) is a block diagram of an embodiment of the inventive multimedia  
9 network utilizing local television channels that are outside the frequency range of  
10 normally received television channels. One of the problems associated with the use of  
11 the allotted television channels is the fact that different cable television signal providers  
12 use different cable channels for carrying their programming content. This makes it  
13 necessary to determine which of the possible allotted channels is being used for  
14 television content and which are available for carrying the locally generated channels.  
15 Further, as the program selection increases, the number of available channels decreases,  
16 making for a potentially unstable multimedia network system. In accordance with one  
17 aspect of the invention, the available channels are determined using a TV tuner  
18 connected with the computer. The allotted TV channel frequencies are sequentially  
19 tuned in, and if a viewable signal is detected, the channel is categorized as "unavailable"  
20 for carrying a local channel. If a viewable channel is not detected, the channel is  
21 categorized as "available" for carrying a local channel. This scanning of the allotted  
22 channels is well known in the art, and typically found as a feature on modern televisions  
23 and VCRs.

24 In accordance with this aspect of the present invention, the "available" channels  
25 are determined by the computer or an external microprocessor 22 that functions along  
26 the lines of the "scanning" systems well known in the art. Once the available local  
27 channels are determined, the microprocessor 22 or computer assigns a channel to each  
28 local channel generating device. The devices are given user selected name  
29 representations, such as "computer", "bedroom VCR", "living room DVD player", etc.  
30 so that the users do not have to remember which channel is associated with which  
31 device. Further, a system maintenance feature can be provided for periodically  
32 scanning the allotted television channels to ensure that no new channels or other  
33 changes have been made by the cable television provider. In the event that a channel  
34 change is detected that interferes with one or more of the locally generated channels, the  
35 maintenance system automatically re-allocates the channels, and either alerts the user to  
36 change the local channel frequency for a particular device (manual configuration) or  
37 sends the appropriate command signals to make the appropriate changes.

38 However, as shown in Figure 3(n), a simplified system is obtained by using  
39 local channels that are outside the range allotted to TV channels. In this case, the

1 inventive system box at the local audio and/or video source (computer, VCR, stereo,  
2 etc.) includes an a/v signal modulator that is capable of creating a signal that can be  
3 transmitted over, for example, the home coaxial network, but that is outside the allotted  
4 frequency range of television signals. At the display device end (TV, stereo, VCR,  
5 computer, etc.) a demodulator or audio and/or video signal tuner is provided having  
6 tuning characteristics that enable the signals that are carried by frequencies not in the  
7 allotted TV band to be tuned in and demodulated. The demodulated audio and/or video  
8 signals can be converted at the display end to a channel that can be tuned in by a typical  
9 device, such as the conventionally used channels three and four for VCRs and set top  
10 boxes, or an appropriate radio station. Alternatively, the demodulated a/v signals can  
11 be inputted to the VCR (or TV etc.) through the a/v in jacks (in a manner similar to  
12 connecting a video camcorder to the RCA jacks of a VCR). This configuration of the  
13 present invention allows a more efficient use circuit components since the local channels  
14 are not subject to change with different cable television providers. Further, since the  
15 allotted cable television channels are untouched, they are still available for line up  
16 changes by the cable system provider.

17 In accordance with this aspect of the inventive multimedia network, a computer  
18 node is provided including computer display local channel generating means for  
19 generating a computer display local television channel. The computer display local  
20 television channel contains an output signal (audio and/or video) corresponding to the  
21 computer display output signal generated by the computer located at the computer node.  
22 Alternatively, the local channel may be an audio only channel. The computer display  
23 local television channel comprises of a local carrier frequency that is outside the  
24 frequency range allotted to cable television channels that is used to modulate the audio  
25 and/or video data generated by the computer. If necessary, a scan converter or other  
26 well know device can be provided to convert the video data generated by the computer  
27 to a signal that can be modulated by the carrier frequency so that it will be transferable  
28 over the home network, such as the home electrical wiring, telephone line or coaxial  
29 cable network. The computer display local channel allows the video data generated by  
30 the computer to be displayed on a television located on the multimedia network remotely  
31 from the computer. Since, in this embodiment, the computer display local channel is  
32 not tunable by a conventional television, the output signal from the computer must first  
33 be demodulated from the local carrier frequency by demodulation means. The  
34 demodulation means removes the local carrier signal from the audio and/or video signal  
35 that was output by the computer. This demodulated output signal can be fed to an  
36 appropriate a/v in jack of a conventional VCR (such as an RCA-type jack) or to an  
37 appropriate a/v in jack on some televisions.

38 The computer node also includes manual channel Selecting means for manually  
39 selecting the local carrier frequency for the computer display local television channel.

1 In this embodiment, the computer display local television channel is one of a  
2 predetermined set of local carrier frequencies. Stated otherwise, either a set of  
3 frequency generators or a variable frequency generator is provided to generate the local  
4 carrier frequencies that are outside the range of frequencies allotted to the television  
5 channels that are normally tunable by a conventional television. The frequency  
6 generators are of known construction, and may be simple circuits that are dedicated to  
7 output a signal preset carrier frequency. For example, a carrier frequency of 850Mhz  
8 may be used as one of the local channel frequencies. Thus, a frequency generator is  
9 provided that outputs the 850Mhz frequency is manually selectable by the user.  
10 Alternatively, the computer can be used to assign the local carrier frequencies, and the  
11 addressability of the units at the nodes utilized to ensure that each of the available  
12 frequencies is assigned to only one device output, or that if two devices are assigned the  
13 same local channel frequency, they are not both outputting the local channel at the same  
14 time (this way, more devices than there are local carrier frequencies available can be  
15 connected to the network at one time, with the computer keeping track of which device  
16 is assigned which frequency)

17 The computer node also including device control signal generating means 16  
18 controllable by the computer for generating device control signals transferable over the  
19 multimedia network and effective to selectively control at least one video device located  
20 on the multimedia network remotely from the computer. The computer node further  
21 including computer control signal receiving means 12 for receiving computer control  
22 signals transferred over the multimedia network.

23 A video device node including device control signal emitting means 14 receives  
24 the device control signals and for emitting video device control signals effective for  
25 controlling a video device located on the multimedia network remotely from the  
26 computer so that the video device can be remotely controlled by the computer. The  
27 video device node further include computer control signal generating means 15  
28 controllable by a user input device 18 for generating computer control signals  
29 transferable over the multimedia network so that the computer can be remotely  
30 controlled in response to a user input.

31 In accordance with this aspect of the invention, the video device node may  
32 further include Node modulation means for converting the computer display local  
33 channel to a television frequency of channel 3 or channel 4. In this case, the computer  
34 display local channel is received having a frequency that is not tunable by the television  
35 or VCR, but this signal is converted to channel 3 of 4, as is typically done in  
36 conventional video device.

37 Figure 3(o) is a block diagram showing a configuration of the inventive  
38 multimedia network for directing data to and for controlling devices capable of  
39 recording one type of data to record data not normally recorded by the device. In

1 accordance with this aspect of the invention, the computer is utilized for directing the  
2 reception of video, audio, digital data, modem and modem-like signals, etc. to a  
3 recording device connected to the inventive multimedia network. For example, a VCR  
4 tape or random access video recorder can be employed for recording a radio program  
5 and/or songs from a CD player.

6 Figure 3(p) illustrates a configuration of the inventive multimedia network  
7 having a wireless connection between the computer node and a wirelessly linked  
8 computer; the wireless linked computer being enabled for use with the inventive  
9 multimedia network via wireless components incorporated in a standard PCI or  
10 expansion module. In accordance with this aspect of the invention, the receiving and  
11 transmitting rf circuitry is connected to a notebook computer via the expansion bay  
12 provisions of the computer. The received video data is provided to the notebook  
13 computer and can be displayed (via software control) either full screen or within a  
14 window. A CCD camera, or the output of the notebook video circuit can be converted  
15 to an rf signal for transmission to devices connected with the multimedia network. A  
16 control signal generator is controlled in response to input from a user via a connection  
17 with the keyboard, communication port, mouse-type input device, etc. via the  
18 connection with the computer's expansion bay.

19 Figure 3(q) illustrates a configuration of the inventive multimedia network  
20 having a wireless connection between the computer node and a wireless display  
21 terminal, the wireless display terminal being enabled with a wireless transmitter and  
22 receiver for use with the inventive multimedia network and for use with other similarly  
23 configured wireless display terminals. Thus, the inventive wireless display terminal  
24 can be used for displaying data transmitted from the multimedia network, and can be  
25 used for communication and data exchange (video, audio, binary, etc.) between  
26 similarly configured devices.

27 Figure 3(r) illustrates a configuration of the inventive multimedia network  
28 having a wireless connection between the computer node and a wireless display  
29 terminal, the wireless display terminal being capable of sending video and audio back to  
30 the multimedia network and to other similarly configured wireless display terminals.

31 Figure 3(s) illustrates a configuration of the inventive multimedia network  
32 having a wireless connection between the computer node and a wireless display; the  
33 wireless display terminal being comprised of relatively low cost components.

34 Figure 3(t) illustrates a configuration of an embodiment of a touch screen  
35 wireless remote control device for displaying a same image on the remote control device  
36 screen as is shown on a large display connected with the inventive multimedia network.

37 Figure 4(a) is a flowchart showing the basic method for recording content-  
38 indicating information on a VCR tape in accordance with the present invention.

1       Figure 4(b) is a flowchart showing the basic method for playing back content-  
2     indicating information recorded on a VCR tape in accordance with the present  
3     invention.

4       Figure 4(c) is a flowchart showing the basic method for recording content-  
5     indicating information on a DVD or other random access recorder in accordance with  
6     the present invention.

7       Figure 4(d) is a flowchart showing the basic method for playing back content-  
8     indicating information recorded on a DVD or other random access recorder in  
9     accordance with the present invention.

10      Figure 4(e) illustrates a random access disk recording media having program  
11     content, a program content indicating document, and program content and document  
12     address index signal recorded thereon in accordance with the present invention.

13      Figure 4(f) is a flow chart showing the steps for controlling remote devices  
14     using the inventive wireless terminal via a remote computer in accordance with the  
15     present invention.

16      Figure 4(g) is a flow chart showing the steps for choosing the display selection  
17     for the inventive wireless terminal.

18      Figure 5 is a block diagram illustrating a configuration of the inventive  
19     multimedia network configured as stand-alone accessory boxed distributed on network  
20     through direct and wireless connections. The user input can be through  
21     keyboard/mouse, voice recognition or remote control. The connection for transmitting  
22     and receiving the information signal can be through the USB, ADB, serial, telephony,  
23     modem, game, parallel, data port, video port, etc., incorporated with a conventional  
24     personal computer. The VCR tape header information and data signal can be an  
25     inaudible signal that can be recorded on the VCR tape and detected using a software-  
26     based frequency filter or an electronic circuit-based frequency filter. The wireless  
27     transceiver 32 can be replaced with a hard-wired co-ax, home network system - like  
28     firewire, via existing phone lines or electrical wiring, etc. An FM circuit can be used,  
29     like that used by wireless mics and instrument pickups.

30      Figure 6 is a block diagram showing the use of microphone and speaker ports  
31     of a computer or video device for transferring signals for recording and receiving VCR  
32     tape content information over the inventive multimedia network.

33      Figure 7 is a block diagram showing the inventive multimedia network  
34     configured as an add-on part for a computer and imbedded VCR system;

35      Figure 8 is a block diagram showing the inventive multimedia network  
36     distributed over an existing home phone line network for transferring video, audio  
37     and/or computer data as a digital and/or analog signal.

1        Figure 9 is a block diagram showing the inventive multimedia network  
2 distributed over an existing home coaxial cable television network for transferring  
3 video, audio and/or computer data as a digital and/or analog signal.

4        Figure 10 is a block diagram showing the inventive multimedia network  
5 distributed over the existing home electrical wiring network for transferring video,  
6 audio and/or computer data as a digital and/or analog signal.

7        Figure 11 is a block diagram illustrating the capabilities of a single computer-  
8 enabled set top box being available at any TV on the inventive multimedia network.

9        Figure 12 shows the details of a distributed computer-enabled set top box  
10 capabilities distributed over the inventive multimedia network.

11       Figure 13 is a block diagram showing a basic configuration of an inventive  
12 addressable multimedia network.

13       Figure 14(a) is a schematic representation of a VCR tape recorded in accordance  
14 with the inventive method for indicating the content recorded on a videotape. Figure  
15 14(b) is an drawing schematically illustrating data recorded on a conventional VCR  
16 tape, showing a portion of the tape being used to record audio and video information  
17 that is actually displayed on a television, and another portion of the tape having room  
18 for piggyback data. Figure 14(c) is an drawing schematically illustrating data recorded  
19 on a conventional VCR tape, showing a portion of the tape being used to record audio  
20 and video information that is actually displayed on a television, and another portion of  
21 the taped being used for recording inaudible tone signals used as recorded control cue  
22 information recorded throughout the tape or at specific locations in accordance with the  
23 present invention. Figure 14(d) is a drawing schematically illustrating data recorded on  
24 a conventional VCR tape, showing a portion of the tape being used to record audio and  
25 video information that is actually displayed on a television, and another portion of the  
26 taped being used for recording tape identifying information and location on tape  
27 identifying information throughout the tape or at specific locations in accordance with  
28 the present invention. Figure 14(e) is an drawing schematically illustrating data  
29 recorded on a conventional VCR tape, showing a portion of the tape being used to  
30 record audio and video information that is actually displayed on a television, and  
31 another portion of the taped being used for recording tape identifying information  
32 and/or location on tape identifying information and/or commercial skip data throughout  
33 the tape and/or at specific locations in accordance with the present invention;

34       In accordance with this aspect of the present invention, a method and apparatus  
35 are provided for controlling a video recorder through control signals generated by a  
36 remote computer. The content-indicating information corresponding to content to be  
37 recorded on a videotape is determined as described herein. The determined content-  
38 indicating information in a tape database on a computer memory, such as a hard drive,  
39 or on a memory device associated with a dedicated microprocessor 22. A tape

1 identification value for the videotape is determined. The tape identification value may  
2 be a user-inputted value or a computer or microprocessor 22 generated value, or a value  
3 received from another source such as an Internet or electronic programming guide. If  
4 an identification value is detected on a tape, then there is no need to determine a new  
5 value for it (unless the tape is to be reformatted or there is some other reason to change  
6 its identification value. The tape identification value is stored in the tape database and  
7 used to match a tape inserted in a VCR connected with the inventive multimedia  
8 network with other data stored in the tape database.

9 A recordable identification signal is generated by the computer or a  
10 microprocessor 22 for recording on the videotape. The recordable identification signal  
11 corresponds to the tape identification value and is transferred through connects of the  
12 computer and the remotely located VCR to the multimedia network. The recordable  
13 identification signal is transferred over the network to a recording head of a videotape  
14 recorder and the videotape recorder is controlled by control signals generated by the  
15 computer or a microprocessor 22 to record the tape identification signal on the videotape  
16 in the VCR. The tape identification signal can be recorded substantially continuously  
17 during the recording of the content signal on the videotape. It can be, for example, an  
18 inaudible tone signal or other recordable data that does not substantially interfere with  
19 the viewer's viewing and listening to a TV program or other content recorded on the  
20 videotape. The tape identification signal can be recorded non-continuously during the  
21 recording of the content signal on the videotape, for example, as part of a tape  
22 information header recorded at the beginning of the tape.

23 During use, a content signal (such as a TV program) containing content to be  
24 recorded on the videotape is received. The content signal is mixed with the tape  
25 identification signal and transferred as a mixed signal to the recording head of the  
26 videotape recorder. The appropriate control signals are generated by the computer or  
27 microprocessor 22 and transferred to the VCR (or other recording device, such as a  
28 DVD player or digital VCR) for controlling it to record the content and tape  
29 identification mixed signal. Control cue information is determined for use in  
30 automatically controlling the videotape recorder (as described herein, or for other  
31 purposes). A recordable control cue signal corresponding to the control cue  
32 information is generated and mixed with the content and tape identification mixed  
33 signal. Or, the control cue information and/or the content and/or the tape identification  
34 signal (and/or the commercial break information described herein) can be generated  
35 separately or mixed depending on the intended functionality. The mixed control cue,  
36 content and tape identification signal is transferred to the recording head of the  
37 videotape recorder and the videotape recorder is controlled to record the control cue,  
38 content and tape identification mixed signal. At least one of the recordable control cue  
39 signal and the tape identification signal comprises a signal recordable on the videotape

1 that is not displayed during the normal playback of the tape. At least one of the  
2 recordable control cue signal and the tape identification signal comprises an inaudible  
3 tone signal. At least one of the recordable control cue information, the tape  
4 identification value and the content-indicating information can comprise HTML data.

5 The present invention provides an effective apparatus and method of  
6 controlling a video recorder through control signals generated by a remote computer in  
7 accordance with control cues stored in a tape database. Control cues corresponding to  
8 the generation of control signals under the control of a computer for controlling a remotely  
9 located video recorder are determined and stored in a tape database. To appropriately  
10 control the VCR via control signals generated by the remotely located computer or  
11 microprocessor 22, a generation time for generating a control signal corresponding with  
12 the control cue information for use in automatically controlling the videotape recorder  
13 can be determined. The generation time is determined by generating a tone signal  
14 during the recording of the videotape, the tone signal being an indication of the  
15 generation time for generating the control signal corresponding with the control cue  
16 information. The generation time can be determined as a time value occurring after a  
17 detection of the tone signal during the playback of the videotape. The time value  
18 corresponding to the generation time is stored in the tape database.

19 In accordance with the present invention, a video recorder is controlled through  
20 control signals generated by a remote computer for indicating the content recorded on a  
21 videotape. Control signals are generated using a computer for controlling a video  
22 recorder to playback a recordable identification signal previously recorded on a  
23 videotape. The recordable identification signal is transferred to the computer and a tape  
24 identification value determined (via software or a detection circuit) for the videotape.  
25 The tape identification value is compared with data stored in a tape database, or  
26 otherwise used to determine which tape is in the VCR. The content-indicating  
27 information stored in the tape data base corresponding to the tape identification value is  
28 thus found so that a representation of the content of television programs recorded on the  
29 videotape can be displayed by generating a graphical information screen, voice  
30 generation or other feedback that is generated by the computer or microprocessor 22  
31 and displayed on the TV where the user is located (not necessarily where the VCR is).

32 Figure 14(b) is a schematic representation of a VCR tape recorded with short  
33 portions of the different television programs or home video recording segments  
34 recorded at the beginning of the tape for facilitating recorded content selection.

35 Figure 14(c) is a drawing schematically illustrating data recorded on a  
36 conventional VCR tape, showing a portion of the tape being used to record audio and  
37 video information that is actually displayed on a television, and another portion of the  
38 tape having room for piggyback data.



1        Figure 14(d) is an drawing schematically illustrating data recorded on a  
2 conventional VCR tape, showing a portion of the tape being used to record audio and  
3 video information that is actually displayed on a television, and another portion of the  
4 taped being used for recording inaudible tone signals used as recorded control cue  
5 information recorded throughout the tape or at specific locations in accordance with the  
6 present invention.

7        Figure 14(e) is an drawing schematically illustrating data recorded on a  
8 conventional VCR tape, showing a portion of the tape being used to record audio and  
9 video information that is actually displayed on a television, and another portion of the  
10 taped being used for recording tape identifying information and location on tape  
11 identifying information throughout the tape or at specific locations in accordance with  
12 the present invention.

13        Figure 14(f) is an drawing schematically illustrating data recorded on a  
14 conventional VCR tape, showing a portion of the tape being used to record audio and  
15 video information that is actually displayed on a television, and another portion of the  
16 taped being used for recording tape identifying information and/or location on tape  
17 identifying information and/or commercial skip data throughout the tape and/or at  
18 specific locations in accordance with the present invention.

19        Figure 15 is a schematic representation of the VCR tape shown in Figure 14.

20        Figure 16 is a schematic representation of the VCR tape shown in Figure 14.

21        Figure 17 is a flow chart showing a tape formatting operation in accordance  
22 with the inventive method for indicating the content recorded on a videotape.

23        Figure 18 is a flow chart of a pre-recording procedure in accordance with the  
24 inventive method for indicating the content recorded on a videotape.

25        Figure 19 is a flow chart of the tape recording procedure in accordance with the  
26 inventive method for indicating the content recorded on a videotape. The present  
27 invention can be used to correct Y2K problem of many VCRs which will not be able to  
28 be programmed after 12/31/99 (or some other date). If counter information is available,  
29 it can be used instead of tone signals to determined where the recorded portions begin  
30 and end. The end of the last recorded portion can also be found by detecting where  
31 there is no video signal recorded (in the case of a new unrecorded tape). The  
32 approximate location of tone signals are determined by calculating the FF (or RW) time  
33 to get to a known location on the tape.

34        The header, start, end, etc., signals are generated by the computer. They may  
35 be modem signals, or other tone signals. They do not have to be inaudible (they may  
36 be video data), and the volume of the TV can be muted via the remote control during  
37 times that these signals are being played back from the tape. In the case of video data,  
38 the pixel information can be used to carry binary information. For example, the pixel  
39 state, black or white, can be used to convey the binary number 1 and 0, respectively.

1 The binary data corresponding to the HTML document (or the content-indicating  
2 information) can be converted to pixel data representation and recorded as frames of  
3 video on the videotape. Upon playback, the frames of video data received from the  
4 videotape can be digitized by the computer to extract the binary data and thus  
5 reconstitute the HTML document or content-indicating information. The default could  
6 be to program the VCR to timer-record, which can be done through OSM or VCR+.  
7 The computer or microprocessor 22 can be used for timer recording for VCRs that are  
8 not in database, or for VCRs that are not Y2K compliant (after 12.31.99), or for any  
9 other reason that the VCR program record capability is not available or the logical  
10 choice. If the VCR programming function was used, then the computer or  
11 microprocessor 22 will have to record the End-Program signal at the next opportunity.  
12 Thus, there would need a mechanism to detect if the tape was removed or the end-of-  
13 program location moved from the recording spot, problem can be solved by finding  
14 end-of-program location or by detecting the end of recorded data on tape. The system  
15 can be self-contained in a VCR, without any computer connection. A small  
16 programmable microprocessor 22 would be used to generate and detect the head info  
17 and the program start and end info. A standard can be formed for licensing to VCR  
18 manufacturers so that their VCRs can read and write header and program information.  
19 In the case of a system with access to the tape counter (or other tape position  
20 determining means), more precise locations of the signals can be found, and- there  
21 might only be need for recording the header information since it will have the precise  
22 tape positions of the start and end of each program recorded on the tape.

23 Figure 20 is a flow chart showing the playback procedure of a selected pre-  
24 recorded program in accordance with the inventive method of indicating the content  
25 recorded on a videotape.

26 Figure 21 is a block diagram showing an example configuration of the inventive  
27 multimedia network containing multi-purpose nodes distributed over a pre-existing  
28 coaxial cable television network.

29 Figure 22 is a continuation of the example multimedia network shown in Figure  
30 21.

31 Figure 23 is a continuation of the example multimedia network shown in Figure  
32 21.

33 Figure 24 is a continuation of the example multimedia network shown in Figure  
34 21. A selectable frequency modulator or tuner can be used for tuning in the shows  
35 selected via the control signals, or a predetermined tuner (one of the VCRs or cable set  
36 top boxes) can be controlled to tune in the channels that are output on that sources in-  
37 house channel. Any device that is shown with a wireless connection can typically also  
38 be connected to the network directly.

1        Figure 25 is a perspective view of a wireless multimedia computer for use with  
2 the wireless distribution node of the inventive multimedia network shown in Figure 24.  
3 Figure 26 is a schematic side view showing parts of the wireless computer shown in  
4 Figure 24. In accordance with an embodiment of this invention, the wireless  
5 multimedia computer includes a detachable wireless display terminal. When used  
6 within range of a wireless transceiver 32 node connected with the inventive multimedia  
7 network, the display terminal can be detached from the keyboard, computer and storage  
8 24 device portion and act as a wireless display terminal as described with reference to  
9 Figures 27 and 28.

10        Figure 27(a) is a front view of a wireless display terminal for use with the  
11 wireless distribution node of the inventive multimedia network shown in Figure 24. As  
12 with the other wireless display devices and computers described herein, the wireless  
13 display terminal receives data signals through an antenna that is distributed on the  
14 inventive multimedia network. In the case of the wireless display terminal shown in  
15 Figure 27, a touch screen can be used to input user commands. Alternatively, another  
16 input device can also be used such as track pads and voice recognition. In the case of  
17 voice recognition, components can be incorporated along the lines of the remote  
18 controller with a built in microphone described herein.

19        Figure 27(b) is a perspective view of the wireless display terminal for use with  
20 the wireless distribution node of the inventive multimedia network shown in Figure 24.  
21 The wireless display terminal may include a directional or patch antenna that fits within  
22 or is fixed to a housing that receives and transmits data between the wireless display  
23 terminal and the other devices, such as the computer, on the network. The housing  
24 holds an LCD screen (which may have a touch screen associated with it). The  
25 computational power of the remotely located computer is controllable by the wireless  
26 distributed network terminal, and the wireless display terminal acts as a monitor for the  
27 computer. Thus, there is no need to include much, if any, computing power onboard  
28 the wireless distributed network terminal. The wireless display terminal also does not  
29 require much, if any, storage 24 capacity, since the computer hard drive and other  
30 storage 24 devices connected to the network can be accessed. Accordingly, the  
31 inventive wireless display terminal can be built for relatively low cost, have relatively  
32 low weight and have relatively low power requirements as compared with a  
33 conventional lap top computer.

34        The inventive wireless display terminal system is for use with a multimedia  
35 network that has a wireless transceiver 32 node for receiving and transmitting control  
36 signals and video data to wireless devices. The inventive multimedia network is an  
37 example of such as network, but is not the only such network that can be utilized with  
38 the inventive wireless display terminal system. The display terminal device includes a  
39 housing member and a display screen held by the housing member. Computer control

1 signal generating means 15 generates computer control signals for controlling a  
2 remotely located computer. A display driver drives the display screen in response to a  
3 display signal generated by the remotely located computer. A terminal side wireless  
4 transceiver 32 is disposed within the housing member and transmits the computer control  
5 signals to the remotely located computer as a wireless signal. The terminal side  
6 wireless transceiver 32 also receives the display signal generated by the remotely  
7 located computer as a wireless signal. By this construction, a light weight, low power  
8 and relatively lower cost easily portable device is obtained that has most if not all the  
9 capabilities of the bulky and non-portable remotely located desktop computer. Further,  
10 the inventive wireless display terminal can be configured with some or all of the  
11 components described herein for the device and computer nodes, and thus provides a  
12 very flexible display and control system for viewing video and computer data generated  
13 by any of the devices and computers connected to the inventive multimedia network.

14 The signal generated by the remotely located computer includes computer  
15 display video data. Wireless video receiving means receives a wireless video signal  
16 containing the computer display video data generated by the remotely located computer.  
17 A Touch sensitive input device 80 can be built into the inventive wireless display  
18 terminal for receiving user input for controlling the generating of the computer control  
19 signals. The Touch sensitive input device 80 may be at least one of a touch screen  
20 disposed adjacent to the display screen, a pressure sensitive keyboard, a track pad and a  
21 track ball. Further, a voice recognition system, as described herein, can be employed  
22 for controlling the remotely located computer and the other devices connected to the  
23 network via user voice commands.

24 Depending on the configuration of the inventive network, or network and device  
25 connections that are anticipated, the terminal side wireless transceiver 32 can be  
26 constructed of at least one transmitter and one receiver comprised of an infrared  
27 transmitter, an infrared receiver, an ultrasonic transmitter, an ultrasonic receiver, a rf  
28 transmitter and an rf receiver. Thus, the terminal side wireless transceiver 32 can tune  
29 in or transmit two or more simultaneous channels. These channels can be processed by  
30 a video processor into a signal display image. Thus, for example, a multimedia signal,  
31 from a device node, can be combined with a computer monitor image (from a computer  
32 node) into a PIP-type image screen. The wireless display terminal may also include  
33 addressable identification means and any of the local channel selection means described  
34 herein. A wireless transceiver 32 node connected to a hard wired network having a  
35 connection to the remotely located computer can be provided. The wireless transceiver  
36 32 node includes a computer control signal receiver for receiving the wireless signal  
37 including the computer control signals from the terminal side wireless transceiver 32  
38 and a display signal transmitter for transmitting the display signal generated by the  
39 remotely located computer to the terminal side wireless transceiver 32. Further the

1 wireless transceiver 32 node can include the channel selection means for tuning in the  
2 local television and audio channels as described herein. An input device, such as a  
3 CCD camera and/or microphone, can be included to generate a video signal and an  
4 audio signal. The terminal display side wireless transceiver 32 includes means for  
5 transmitting the video signal and audio signal to the wireless transceiver 32 node as a  
6 wireless signal. Thus, the portable wireless display terminal can be used as a  
7 communication port for the in-home video intercom system, Internet-based video phone  
8 system, multi-purpose remote controller and enhanced speaker phone system described  
9 herein. The wireless transceiver 32 node can also be connected directly to the  
10 computer, without any need for a home hard wired network.

11 The inventive wireless display terminal can also include remote control signal  
12 generating means for generating remote control signals effective for controlling  
13 appliances receptive of such control signals. In this case, the appliances can include  
14 video and audio devices connected to the network, or other appliances, such as coffee  
15 makers, dishwashers, etc., can be controlled. For example, the remote control signal  
16 generating means might include a universal IR remote controller. The inventive  
17 wireless display terminal can be connected to a keyboard and CPU unit (like the one  
18 shown in Figures 25 and 26) to act as a display terminal for a portable notebook  
19 computer.

20 Figure 28(a) is an isolated view of a touch screen user input device 18 and LCD  
21 display screen, with a block diagram showing the components of an embodiment of the  
22 inventive wireless display terminal;

23 Figure 28(b) is a front view of an embodiment of the inventive wireless display  
24 terminal having an attachable touch screen/display unit that can be attached to a self-  
25 contained wireless computer as shown in Figure 26, with a wireless component unit  
26 attached to the touch screen/display unit;

27 Figure 28(c) is a front view of the wireless display terminal shown in Figure  
28 28(b) having the wireless component unit being detached;

29 Figure 28(d) shows an embodiment of the inventive wireless display terminal  
30 mounted on a keyboard stand;

31 Figure 28(e) shows the wireless display terminal being detached from the  
32 keyboard stand;

33 Figure 28(f) shows the wireless display terminal having the keyboard stand  
34 being placed in a stowed position;

35 Figure 28(g) shows the wireless display terminal having the keyboard stand  
36 disposed in the stowed position behind the display screen;

37 Figure 28(h) shows the wireless display terminal having the keyboard stand  
38 disposed in a protective position in front of the display screen;

1           Figures 28(i) and 28(j) show the inventive antenna assembly 300 mounted for  
2 use with a laptop computer system or the inventive wireless terminal. In this case, the  
3 laptop computer or wireless terminal includes the radio signal transmitting device 302,  
4 which may be used to communicate with a remote computer located on the inventive  
5 multimedia network, and/or may be used in conjunction with a wireless modem or  
6 telephone for communication via the internet, satellite or land-based communications  
7 network. The laptop computer includes a communication circuit having a signal  
8 generator that is electrically coupled with the driven antenna member 304 of the  
9 inventive antenna assembly 300. The thus configured laptop computer can be used for  
10 wireless communication via, for example, a terrestrial cellular telephone network or  
11 orbiting satellite. The communication circuit may include a modem for the transmission  
12 of digital data over the inventive multimedia network, the internet or other  
13 communications networks. A local channel generator can be used to generate a local  
14 channel originating from the wireless terminal and transmitted via the communication  
15 circuit. During use of the wireless terminal, the user positions the top half containing a  
16 display screen 336 and the inventive antenna assembly 300 in an upright position. In  
17 this position, when the user views the display screen 336, the shielding side 308 of the  
18 inventive antenna assembly 300 is disposed so that the radio signal transmitted from the  
19 inventive antenna assembly 300 is directed away from the user and thus more effective  
20 for communication. The transmission side 306 of the inventive antenna assembly 300  
21 is directed away from the user, so that the radio signal can be transmitted in directions  
22 away from the user. By providing the inventive antenna assembly 300 at the position  
23 on the upper portion of the laptop computer, the radio signal transmitted is not absorbed  
24 by the body of the user, and is directed away for effective communication with a remote  
25 receiver. A radiation transmissive window 338 may be provided for allowing the  
26 transmission and reception of radio signals by the inventive antenna assembly 300.  
27 Also, a separate reception antenna (not shown) may be provided to further enhance the  
28 communication characteristics of the inventive laptop computer capable of wireless  
29 communication.

30           Figures 28(k) and 28(l) show the inventive antenna assembly 300 mounted with  
31 a personal computing device known as a PDA. In this case, the inventive antenna  
32 assembly 300 is electrically coupled with the communication circuit of the PDA. For  
33 example, the communication circuit may include a modem for the transmission of  
34 binary data over, for example, the inventive multimedia network, a terrestrial cellular  
35 telephone network or orbiting satellite. The radio signal is transmitted through the  
36 transmission side 306 of the inventive antenna assembly 300 in directions away from  
37 the user for effective communication with a remote receiver. A radiation transmissive  
38 window 338 may be provided for allowing the transmission and reception of radio  
39 signals to and from the communication circuit of the PDA.

1           Figure 28(m) is an isolated enlarged cross sectional view of a flexible  
2 rechargeable battery 126 used in accordance with the present invention. The flexible  
3 rechargeable battery 126 is used, in accordance with the present invention, as a signal  
4 shielding battery 126 that includes at least one shielding material that is effective for  
5 electrically shielding electromagnetic signal. The signal shielding battery 126 is  
6 preferably a rechargeable plastic lithium-ion battery, such as that produced by Bellcore,  
7 of Livingston, NJ. Such a battery has an unfolded thickness that is about the same as  
8 the thickness of a credit card. The battery 126 comprises a plastic member 128, which  
9 is formed by impregnating a plastic with a liquid electrolyte. The resulting plastic  
10 electrolyte member 128 is typically about 50% liquid and cannot leak. The plastic  
11 electrolyte member 128 is sandwiched between a positive plastic electrode 130 melded  
12 to an aluminum mesh 132 and a negative plastic electrode 134 melded to a copper mesh  
13 136. Thus, in accordance with the present invention, the signal shielding battery 126  
14 comprises a negative planar electrode side (negative plastic electrode 134 and copper  
15 mesh 136) disposed at an electrically negative side of the battery 126, a positive planar  
16 electrode side (positive plastic electrode 130 and aluminum mesh 132) disposed at an  
17 electrically positive side of the battery 126, and an electrolyte member 128 disposed  
18 between the negative planar electrode side and the positive planar electrode side. At  
19 least one of the negative planar electrode side and the positive planar electrode side is  
20 comprised of the shielding material for electrically shielding electromagnetic, or  
21 microwave, signal. In accordance with the preferred embodiment of the invention, the  
22 negative planar electrode side comprises the shielding material. Preferably, an  
23 electronic component 138 that is to be shielded is grounded to the negative planar  
24 electrode side through an appropriate electrical connection, such as a ground wire 140  
25 electrically connected between a connecting land 142 of the battery 126 and a  
26 connecting land 142 of the electrical component 138. To provide additional  
27 electromagnetic shielding, a signal absorbing layer 144 may be disposed as a laminate  
28 component of the signal shielding battery 126, as shown in Figure 28(m). Also, a  
29 signal blocking layer and/or reflecting layer (not shown) may be included in addition to,  
30 or substituted for, the signal absorbing layer 144. The signal blocking, reflecting  
31 and/or absorbing layer may include a magnetic shielding material, such as Mu metal, to  
32 enhance the signal shielding features of the invention.

33           Figure 28(n) is an isolated schematic view of a wireless terminal circuit board  
34 (electronic component 138) disposed adjacent to the flexible rechargeable battery 126.  
35 The signal absorbing layer 144 (and/or signal blocking layer, signal reflecting layer)  
36 may be disposed as a separate structure adjacent to a folded signal shielding battery  
37 126, which may or may not include a laminate component signal absorbing layer 144.  
38 In accordance with the present invention, as shown in Figure 28(n), the signal shielding  
39 battery 126 comprises a thin laminar structure that can be cut, shaped and folded into

1 appropriate dimensions to fit within a case shell of the wireless terminal. By this  
2 construction, the signal shielding battery 126 functions both as a signal shielding  
3 member and as a rechargeable electrical power source. The obtainable voltage from the  
4 signal shielding battery 126 can be adjusted by electrically connecting two or more  
5 similarly constructed batteries.

6 An electronic component 138 is provided, such as the circuit components,  
7 internal antennae, keyboard, speaker, microphone, etc. of a wireless terminal. A signal  
8 shielding battery 126 is disposed adjacent to the electronic component 138. The battery  
9 126 is comprised of at least one shielding material (such as the copper mesh 136 of the  
10 negative planer electrode side) which is effective for electronically shielding  
11 electromagnetic signals, thus reducing unwanted rf signal noise from emanating from  
12 or entering into the interior space of the wireless terminal case. As shown, the battery  
13 comprises a negative planer electrode disposed at an electrically negative side of the  
14 battery. A positive planer electrode is disposed at an electrically positive side of the  
15 battery, and an electrolyte member 128 is disposed between the negative planer  
16 electrode and the positive planer electrode. Preferably, at least one of the negative  
17 planer electrode and the positive planer electrode comprises a material which is effective  
18 to act as the shielding material for shielding an electrode magnetic signal. Thus, by this  
19 construction, an electromagnetic shield is provided for shielding the electronic  
20 component 138 of the wireless terminal from incoming electromagnetic wave signal (to  
21 reduce circuit noise), and for shielding electromagnetic wave signal emanating from the  
22 electronic component 138 (to prevent exposure of the user and external devices from the  
23 electromagnetic signal generated by the components of the wireless terminal).  
24 Preferably, as shown in Figure 28(n), the electronic component 138 is electrically  
25 grounded to the electrically negative side of the signal shielding battery 126. A circuit  
26 ground wire 140 may be soldered or otherwise fixed to the electronic component 138  
27 (circuit board) and the copper mesh 136 of the signal shielding battery 126.

28 Figure 28(o) is a cut away perspective top view of a flexible rechargeable  
29 battery 126 and a case shell substrate 146 prior to assembly in accordance with a  
30 manufacturing aspect of the inventive method for shielding an electronic component  
31 138. The flexible rechargeable battery 126 preferably has the structure described above  
32 with reference to Figures 23(a) and 23(b). The flexible rechargeable battery 126 is  
33 preferably fixed to a case shell substrate 146 using an adhesive 148. The adhesive 148  
34 may have signal shielding, reflecting or blocking properties, and may be comprised of,  
35 for example, fine Ferro-magnetic particles dispersed within a rubber or epoxy adhesive  
36 medium. Prior to assembly, the flexible rechargeable battery 126 and the case shell  
37 substrate 146 are substantially flat sheet-like members, and thus can be easily shipped  
38 from a place of manufacture to a distant place of assembly. The case shell substrate 146  
39 has notches 150 which facilitate folding of the case shell substrate 146. Two of the



1 edges of the case shell substrate 146 terminate in toothed engaging structures 152  
2 which, as shown in Figure 28(p) mate together and become engaged to retain the case  
3 shell substrate 146 and the rechargeable battery 126 in a folded position. By this  
4 structure, a wireless terminal case member can be easily formed simply by folding the  
5 rechargeable battery 126 and case shell substrate 146 and engaging the toothed  
6 engaging structures 152. In accordance with the present invention, the wireless  
7 terminal case member is very easy and inexpensive to manufacture, while providing  
8 both electromagnetic shielding and a rechargeable battery power supply.

9       Figure 28(p) shows a cross-section top view of the inventive wireless terminal  
10 case member formed from the assembled flexible rechargeable battery 126 and case  
11 shell substrate 146 shown in Figure 28(o). As shown, once the flexible rechargeable  
12 battery 126 and case shell substrate 146 are folded, and the toothed engaging structures  
13 152 are mated, an electrically shielded interior space 154 is defined within the formed  
14 wireless terminal case member. The electrically shielded interior space 154 is  
15 electromagnetic shielded to prevent a signal emanating from internally disposed  
16 electronic components 138 from reaching the external devices, and also preventing  
17 external electromagnetic signal from reaching the electrically shielded interior space 154  
18 of the wireless terminal case member to prevent the unwanted introduction of circuit  
19 noise.

20       Figure 28(q) is a cross-sectional side view taken along line c-c of the assembled  
21 flexible rechargeable battery 126 and case shell substrate 146 shown in Figure 28(p).  
22 In Figure 28(q), the flexible rechargeable battery 126 has more folds, and thus is  
23 shown having more layers than are shown in Figures 24(a) and 24(b). The number of  
24 layers, and thus the length of the unfolded, unassembled flexible rechargeable battery  
25 126 will depend on factors such as desired battery life, shielding capabilities, weight,  
26 and required interior space 154 of the assembled case shell substrate 146 member. In  
27 accordance with the inventive method for shielding an electronic circuit component, the  
28 rechargeable battery 126 is formed into a hollow shape defining an electrically shielded  
29 interior space 154. An electronic component 138 (wireless terminal circuitry) is  
30 disposed within the electrically shielded interior space 154. The interior space 154  
31 defined by the battery is opened at its ends, and thus preferably these ends should be  
32 electrically shielded to prevent an electromagnetic signal from entering the electrically  
33 shielded interior space 154 and from exiting from the electrically shielded interior space  
34 154. A shielding cap member 156 is fixed to the folded flexible battery to electronically  
35 close the open ends. The shielding cap members 156 may be fixed to the folded  
36 flexible battery 126 using either or both of a conductive adhesive 148 and a conductive  
37 tape (shown in Figure 26(b)).

38       In accordance with the present invention, the circuit components of a wireless  
39 terminal may be disposed within a electrically sealed folded flexible rechargeable battery

1 126 and electrically connected with the battery 126 to enhance the shielding aspects, and  
2 to provide a rechargeable power source for the wireless terminal circuitry. Appropriate  
3 electrode leads 160 may be provided from the wireless terminal circuitry, through the  
4 shielding cap member 156 and electronically connected with a jack 162 so that the  
5 electronic wireless terminal circuitry 138 shielded within the electrically shielded interior  
6 space 154 can be connected with components and peripheral equipment disposed  
7 outside of the electrically shielded interior space 154. In this case, the signal shielding  
8 battery 126 may be formed and sealed to create a hollow electrically shielded interior  
9 space 154 that is electrically sealed to prevent electromagnetic signal in the form of  
10 external noise from effecting the wireless terminal circuitry 138, while preventing an  
11 electromagnetic signal generated by the wireless terminal circuitry 138 from exiting the  
12 electrically shielded interior space 154. The thus formed flexible rechargeable battery  
13 126 containing within a sealed electrically shielded interior space 154 the rf sensitive  
14 components of the wireless terminal circuitry 138 may simply be inserted within a case  
15 shell substrate 146 which includes the other necessary components for the effective use  
16 of the wireless terminal communication. In this case, the folded flexible rechargeable  
17 battery 126 and the wireless terminal circuitry 138 disposed within the electrically  
18 shielded interior space 154 comprise an easy to install modular unit which can be  
19 connected with the non-sensitive rf components of the wireless terminal (not shown)  
20 and electrically connected via the jack 162. By this construction, an easy to carry,  
21 compact unit is provided which includes a self-contained rechargeable power supply.  
22 The wireless terminal circuitry 138 is shielded against electronic noise, and is shielded  
23 from emitting harmful signal and/or electronic noise. The self-contained unit may  
24 include circuitry 138 containing personal data, such as a wireless terminal number,  
25 speed-dial numbers, voice recognition, call log, modem, fax, etc., and may be easily  
26 transported by the user and inserted in a variety of devices. For example, rental car  
27 companies may provide a terminal system which includes all of the necessary hardware  
28 except for that contained within the self-contained unit. A user then merely has to insert  
29 the personalized self-contained unit into the terminal hardware supplied with the rental  
30 car, to instantly obtain a customized wireless terminal communication device.

31 Figure 28(r) is an isolated enlarged cross-sectional view of an assembled and  
32 electrically sealed end of the case shell substrate 146 shown in Figure 28(q). The  
33 shielding cap member 156 is adhered to and fixed with the folded flexible rechargeable  
34 battery 126 through the use of an electrically conductive seal, such as an electrically  
35 conductive adhesive 148 or an electrically conductive tape. As shown, an electrically  
36 conductive adhesive 148 is used to completely seal off the electrically shielded interior  
37 space 154 so that an electromagnetic signal cannot enter or escape from the electrically  
38 shielded interior space 154. Also, the adhesive 148 or tape may comprise appropriate  
39 material, such as silicone, epoxy, etc. to provide a water tight seal thus waterproofing

1 the electrically shielded interior space 154. By this construction, a completely  
2 waterproof wireless terminal may be easily provided, as will be described in more detail  
3 below. In accordance with the present invention, the wireless terminal case member  
4 can be easily formed by fixing the flexible rechargeable battery 126 to the case shell  
5 substrate 146 so that the case member has at least a portion of at least one wall  
6 comprised of the case shell substrate 146 and the battery 126. By this construction, the  
7 overall size of the wireless terminal may be greatly reduced, since the interior portion of  
8 the wireless terminal includes a rechargeable power source that also functions as a  
9 shielding device and as part of the protective case structure. Thus, an external power  
10 pack, which is conventionally required, may be obviated. Also, the case shell substrate  
11 146 may comprise a thin and flexible material, as opposed to the conventionally  
12 required thicker and usually brittle material, since the case member includes both the  
13 structural integrity of the case shell substrate 146 and the structural integrity of the  
14 flexible rechargeable battery 126. Therefore, in accordance with the present invention,  
15 a wireless terminal may be designed having excellent electromagnetic shielding  
16 capabilities to prevent unwanted noise and to prevent interference by an electromagnetic  
17 signal, while having a substantially reduced size and more durable construction as  
18 compared with the conventional art. Also, in accordance with the signal shielding  
19 battery construction described above with reference to Figure 28(m), through-holes  
20 may be easily formed in the battery to electrically connect the electronic components 138  
21 disposed within the electrically shielded interior space 154 with exteriorly disposed  
22 components (i.e., external battery pack, antenna, other wireless terminal components,  
23 speaker, keyboard, etc.). Thus, in accordance with the present invention, a through-  
24 hole may be formed in the signal shielding battery 126, and a conductive wire 164 may  
25 be passed through the through-hole and electrically connected with the electronic circuit  
26 component 138 (as shown in Figure 25(b)).

27 Referring to Figures 28(s) and 28(t), in accordance with one aspect of the  
28 present invention, an antenna assembly 300 is provided for use with a radio signal  
29 transmitting device 302. The radio signal transmitting device 302 may be, for example,  
30 a cellular telephone, walkie-talkie, personal digital assistant ("PDA"), wireless terminal,  
31 computer equipped with wireless communications equipment, mobile fax machine,  
32 transmitter/receiver unit of a personal communication service (PCS) system, or other  
33 radio signal transmitter and/or receiver. The inventive antenna assembly 300 includes a  
34 driven antenna member 304 for transmitting a radio signal from the radio signal  
35 transmitting device 302 to a remote receiver, such as a terrestrial cell site, satellite, PCS  
36 server, or the like, or to . The radio signal is transmitted outward from a transmission  
37 side 306 of the antenna assembly 300, and is blocked from transmission through a  
38 shielding side 308 of the antenna assembly 300. To block the transmission of the radio  
39 signal, and thus prevent unwanted exposure of the user of the radio signal transmitting

1 device 302, radiation absorbing means 310 is disposed at the shielding side 308.

2 During use of the radio signal transmitting device 302, the radiation absorbing means  
3 310 is disposed between the driven antenna member 304 and the user.

4 In accordance with the inventive antenna assembly 300, a first parasitic element  
5 312 (reflector) is disposed during use between the driven antenna member 304 and the  
6 user. A second parasitic element 314 (director) is disposed at the transmission side 306  
7 of the antenna assembly 300. The second parasitic element 314 is disposed during use  
8 so that the driven antenna member 304 is between the second parasitic element 314 and  
9 the user. A significant increase in the power of the signal transmitted outward and  
10 away from the user through the transmission side 306 of the antenna assembly 300 is  
11 attained, as compared with a typical conventional antenna assembly 300. This increase  
12 in forward signal power attains a substantial increase in the range of the inventive  
13 antenna assembly 300, as compared with an antenna having a conventional antenna  
14 construction. The radio signal emitted from a conventional antenna propagates  
15 outwardly in a substantially uniform circular pattern centered on the antenna.

16 In accordance with the inventive antenna assembly 300, the first and the second  
17 parasitic elements 312,314 are disposed from the driven antenna member 304 at a gap  
18 distance that is effective to direct a portion of the radio signal toward the transmission  
19 side 306 of the antenna assembly 300. The parasitic elements 312,314 act as radio  
20 signal reflectors and directors. A dielectric member 316 is disposed in the gap between  
21 the first parasitic element 312 and the driven antenna member 304, and in the gap  
22 between the driven antenna member 304 and the second parasitic element 314.

23 In accordance with the one embodiment of the inventive antenna assembly 300,  
24 the dielectric member 316 may have a high dielectric constant. The dielectric member  
25 316 provides support for the parasitic elements 312,314 and the driven antenna member  
26 304, and also reduces the necessary gap distance between the driven antenna member  
27 304 and the parasitic elements 312,314. The reduction of the gap distance is dependent  
28 on the dielectric constant of the dielectric member 316. It is well known that the rate of  
29 propagation of a radio signal through a medium is dependent on the dielectric constant  
30 of the medium. By providing a dielectric member 316 having a relatively high dielectric  
31 constant in the path of the radio signal propagating between the parasitic elements  
32 312,314 and the driven antenna, applicants have found that the overall size of the  
33 antenna assembly 300 can be reduced. The dielectric member may be comprised of a  
34 ceramic, polymer, or other suitable material, such as a ceramic doped with gadolinium,  
35 aluminum, calcium, vanadium, holmium.

36 In accordance with the preferred embodiment of the inventive antenna assembly  
37 300, the driven antenna member 304 has an effective antenna length that is substantially  
38 one half of the wave length of the radio signal transmitted by the radio signal  
39 transmitting device 302. In a preferred embodiment, the driven antenna member 304 is

1 comprised of two antenna segments, each having an effective antenna length equal to  
2 one quarter of the wave length of the radio signal. The two antenna segments are  
3 driven so as to form a dipole driven antenna member 304.

4 The first parasitic element 312 and the second parasitic element 314 preferably  
5 each have a length that is about one half of the wave length of the radio signal  
6 transmitted by the radio signal transmitting device 302. Also, the dielectric member 316  
7 has a thickness and a dielectric constant effective to approximate the gap distance as  
8 being an air space gap distance of 1/10th of the wave length of the radio signal  
9 transmitted by the radio signal transmitting device 302. This gap distance has been  
10 experimentally proven to enable the range extending capabilities of the inventive antenna  
11 assembly 300.

12 The dielectric member 316 may be formed from a ceramic, polymer, or other  
13 suitable dielectric material. Also, in accordance with the preferred embodiment, the  
14 radiation absorber comprises a conductive material dispersed in a non-conductive  
15 matrix. The conductive material preferably includes at least one of a conductive free  
16 metal, FeO<sub>2</sub>, titanium oxide, a ferromagnetic material, carbonyl iron, ferrite oxide,  
17 garnet, magnesium, nickel, lithium, yttrium, calcium, vanadium and iron-loaded  
18 urethane, neoprene or nitride.

19 Furthermore, in accordance with the preferred embodiment of the inventive  
20 antenna assembly 300, the radiation absorbing means 310 includes a first radiation  
21 absorber portion 320 that is disposed between the driven antenna member 304 and the  
22 metal shell member 318. A second radiation absorber portion 322 is disposed during  
23 use of the radio transmitting device adjacent to the metal shell member 318. Further, in  
24 accordance with the preferred embodiment of the inventive antenna assembly 300, a  
25 dielectric support material 324 is disposed to hold the components of the antenna  
26 assembly 300 at fixed relative positions, and to maintain the overall integrity of the  
27 antenna assembly 300. Preferably, the dielectric support material 324 has a low  
28 dielectric constant, and acts as a filler and support mechanism. The dielectric support  
29 material 324 may comprise a foamed polymer, such as polyethylene, polystyrene,  
30 Styrofoam, rubber, or the like.

31 The directional antenna described herein is useful for communicating with the  
32 inventive multimedia network via a radio transmitting device for transmitting the video  
33 data that is displayed on the wireless display terminal and the computer control signals  
34 originating from the wireless display terminal. The directional antenna can also be used  
35 be used to transmitting wireless modem and telephone data from a radio transmitting  
36 device such as a cellular telephone circuit and/or wireless modem. The directional  
37 antenna includes a first dielectric segment 326. The first dielectric segment 326 is  
38 configured and dimensioned so that during use of the radio signal transmitting device  
39 302, the path of at least a portion of the radio signal propagating between the driven

1 antenna member 304 and the first parasitic element 312 passes through the first  
2 dielectric segment 326. The driven antenna member 304 is formed by depositing a thin  
3 film of conductive material on the surface of a side of the first dielectric segment 326.  
4 This thin film driven antenna member 330 may be formed by vacuum depositing,  
5 sputtering, print screening, spray coating or other known technique. The conductive  
6 material may be a conductive polymer, metal, or the like, such as aluminum, gold,  
7 copper or silver. The conductive material may be formed by thick film deposition on a  
8 substrate, such as the dielectric segment 14, and then selectively etching the thick film.  
9 The thin film driven antenna member 330 is electrically coupled to the communication  
10 circuit of the radio signal transmitting device 302. Thus, a signal generated by the  
11 communication circuit is transmitted through the use of the thin film driven antenna  
12 member 330. A thin film first parasitic element 332 is formed by depositing a  
13 conductive thin film on the opposing face of the first dielectric segment 326. Next, a  
14 second dielectric segment 328 is provided. A thin film second parasitic element 334 is  
15 formed by depositing a conductive material on the appropriate face of the second  
16 dielectric segment 328. The first dielectric segment 326 and the second dielectric  
17 segment 328 are then brought adjacent to one another and fixed with adhesive so that  
18 the thin film driven antenna member 330 is disposed between both the thin film first  
19 parasitic element 332 and the thin film second parasitic element 334. Thus, the first  
20 dielectric segment 326 having a high dielectric constant is disposed in the path of a  
21 portion of the radio signal propagated between the thin film first parasitic element 332  
22 and the thin film driven antenna member 330. Similarly, the second dielectric segment  
23 328 having a high dielectric constant is disposed in the path of a portion of the radio  
24 signal propagated between the thin film second parasitic element 334 and the thin film  
25 driven antenna member 330.

26 The components of the shielding side 308 of the inventive antenna assembly  
27 300 may be formed by first bending the metal shell member 318 into an appropriate  
28 shape, having an appropriate curvature as shown in Figure 28(s). The relatively thin  
29 radiation absorber portion 12 is fixed adjacent to the backside of the metal shell member  
30 318, and then the relatively thick radiation absorber portion 11 is fixed adjacent to the  
31 front side of the metal shell member 318. These components are then brought adjacent  
32 to the first dielectric segment 326. The low dielectric support material 324 is filled in  
33 place so as to bind the various components of the inventive antenna assembly 300  
34 together, and to maintain the integrity of the thus formed system.

35 Figure 29 is a schematic perspective view of a bracelet personal locator for use  
36 with the wireless distribution node of the inventive multimedia network shown in  
37 Figure 24. The personal locators include a wireless signal transmitter that sends an  
38 identification signal to a device, such as a computer or microprocessor 22, to enable the  
39 location of a person to be determined. In this case, if, for example, a phone call comes

1 in for the person, the programs or other content on video and audio devices located  
2 nearby can be muted and the devices used to allow communication between the person  
3 and the caller in the manners described herein.

4 Figure 30 is a schematic perspective view of a badge-type personal locator for  
5 use with the inventive multimedia network shown in Figure 24.

6 Figure 31 is a perspective view of a hand-held personal digital assistant for use  
7 with the wireless distribution node of the inventive multimedia network in Figure 24.

8 Figure 32 is a graphic illustration of an addressable unit pulse train and device  
9 control signal pulse train.

10 Figure 33 is a block diagram showing a configuration of an addressable  
11 multimedia network having a single local channel generator at each node.

12 Figure 33 is a block diagram of another configuration of the inventive  
13 addressable multimedia network.

14 Figure 34 is a block diagram showing a configuration of the inventive  
15 addressable multimedia network having multiple computer nodes and video device  
16 nodes distributed on the network.

17 Figure 35 is a block diagram showing another configuration of the inventive  
18 addressable multimedia network having a node with a double local channel generator.

19 Figure 36 is a block diagram showing another configuration of the inventive  
20 addressable multimedia network having a three channel high-definition location channel  
21 generator.

22 Figure 37 is a block diagram showing another configuration of the inventive  
23 addressable multimedia network having a computer node and a computer signal device  
24 node.

25 Figure 38 is a block diagram showing a example prototype configuration of the  
26 inventive multimedia network.

27 Figure 39 shows some of the windows of the Multimedia Network prototype  
28 FaceSpan project.

29 Figure 40 shows some more of the windows of the Multimedia Network  
30 prototype FaceSpan project.

31 Figure 41(a) is a schematic diagram of a remote control signal playback circuit  
32 module and a remote control signal capture circuit module. The modules connect with a  
33 computer (or other remote control signal generator/detector) and the inventive  
34 multimedia network to enable the computer to capture and learn the remote control  
35 signals remotely generated by an IR generating remote control unit at a device node or at  
36 the computer node. These modules allow the computer to "learn" the various remote  
37 control codes needed to generate device control signals for controlling devices located  
38 remotely on the inventive multimedia network. Figure 41(b) is a schematic diagram of  
39 an IR remote control signal playback circuit module and an IR remote control signal

1 capture circuit module for connecting with a computer (or other remote control signal  
2 generator/detector) and the inventive multimedia network to enable the computer to  
3 capture and learn the remote control signals remotely generated by an IR generating  
4 remote control unit at a device node, and to allow the computer to generate device  
5 control signals for controlling devices located remotely on the inventive multimedia  
6 network. Figure 41(c) is a schematic diagram of an IR detector and emitter unit for use  
7 at a device node to be connected via the multimedia network with the IR circuit modules  
8 shown in Figures 41(a) and (b) located at a computer node or other remote control  
9 signal generating node.

10 The control signal that is captured and that is generated can be an electrical (i.e.,  
11 DC pulse), rf, or IR signal. In the case of the electrical and rf signal, the network (such  
12 as the phone, coaxial and/or electrical wiring) that the computer node is connected with  
13 can be used to transfer the control signals between the computer node and the various  
14 device nodes. Further, the rf signal can be transmitted wirelessly to a matching receiver  
15 located at the device nodes. The control signals that are received from the devices on  
16 the network can be applied as pulse values, voltage values, AC or DC frequency  
17 values, current values, etc. The control signals can be converted (if necessary) to an  
18 appropriate signal that can be received by one or more of the inputs available for the  
19 computer. For example, if the control signal consists of a tone or audio frequency that  
20 is recorded on a videotape (as described herein), then the computer can receive the  
21 control signal as a signal modulated by a local carrier frequency and inputted through a  
22 TV tuner that is internally or externally connected to the computer. The tone frequency  
23 control signal is detected by tuning in the local carrier frequency and demodulating the  
24 audio signal portion. The computer can then detect the tone signal via software that  
25 receives the audio signal and decodes it to detect the particular tone frequency. In the  
26 case of DC pulse data control signals, an example of a connection with the computer for  
27 detecting such control signals is shown in Figure 41(a). In this case, the "paper empty"  
28 pin of the computer's printer port is used to receive the pulse data. The simple circuits  
29 shown in Figure 41(a) and 41(b) were modified from circuits that are discussed in an  
30 Internet web site (<http://www.ee.washington.edu/eeca/circuits/PCIR/Welcome.html>)  
31 where more information on these circuits can be found.

32 The computer receives the control signals from the network and detects various  
33 control and device status information. In some cases, it may be advantageous to have a  
34 stand-alone detector provided. For example, the device status detector shown in Figure  
35 3(m) can be a simple Light detector 76 located at the device node near the TV screen.  
36 When the TV is on, the Light detector 76 outputs an "on" value that results in the  
37 computer remote control signal generator sending a specific "device on" control signal  
38 to the computer. As with the remote control signals that are used for controlling the  
39 computer, this "device on" signal may be accompanied by a "handshake" signal that lets



1 the computer know which TV of all the connected TVs is the one that is being detected  
2 as being on. In this case, the device status detector can be accomplished via software  
3 running on the computer that receives the "device on" control signal and reacts  
4 appropriately. The centralized computer can send a polling signal to each of the device  
5 nodes and addressable devices requesting the status of the devices connected to the  
6 network. The status may include the device's on/off state, current tuner frequency,  
7 volume level, etc. If user sensor means are provided, the status may also include the  
8 location and identification of users.

9 Figure 42(a) shows a display device screen, such as a television, receiving  
10 video data generated by the remotely located computer indicating the initialization of a  
11 video intercom call. Figure 42(b) shows a display device screen, such as a television,  
12 receiving video data generated by the remotely located computer showing a video  
13 intercom call in process. Figure 42(c) shows a display device screen, such as a  
14 television, receiving video data generated by the remotely located computer showing the  
15 zooming in of the caller's image during a video intercom call.

16 Figure 43 is a flowchart showing the operation of a video intercom conversation  
17 in accordance with the present invention.

18 Figure 44(a) shows a display screen, such as a television, receiving video data  
19 generated by the remotely located computer showing a horizontal split screen with an  
20 internet web page and a television program. Figure 44(b) shows a display screen, such  
21 as a television, receiving video data generated by the remotely located computer  
22 showing a picture-in-a-picture (PIP) split screen with an internet web page and a  
23 television program. Figure 44(c) shows a display screen, such as a television,  
24 receiving video data generated by the remotely located computer showing a vertical split  
25 screen with an internet web page and a television program.

26 Figure 45(a) shows a display screen, such as a television, receiving video data  
27 generated by the remotely located computer showing a PIP split screen with a first  
28 television program shown full screen and a second television program shown in PIP  
29 format. Figure 45(b) shows a display screen, such as a television, receiving video data  
30 generated by the remotely located computer showing a PIP split screen with a first  
31 television program shown with its screen size altered to fit within one-half the display  
32 area and a second and a third television program shown in PIP format. Figure 45(c)  
33 shows a display screen, such as a television, receiving video data generated by the  
34 remotely located computer showing a horizontal split screen with a first television  
35 program resized to fit within the top half the display area and a second television  
36 program resized to fit within the bottom half the display area.

37 The flowcharts shown in Figures 46 through 59 illustrate some of the features  
38 and product enhancements that are attainable in accordance with the operation of the  
39 inventive multimedia network. The control of remotely located devices is enabled

1 through the use of a remote control signal generator under the control of a computer or  
2 dedicated microprocessor 22. In particular in the case of a computer, the computer can  
3 be located remotely from the devices that it is controlling (and/or remotely from the  
4 remote control signal generator), with the inventive multimedia network being used to  
5 transfer control signals and data between the computer and the device it is controlling.  
6 Through the use of the present invention, a number of the pre-existing video and audio  
7 devices become "smart" device that get the advantages of the computational ability and  
8 software flexibility of a powerful computer CPU.

9 Figure 46 is a flowchart showing the operation of a computer controlled via  
10 software to enable a remotely located device to record a radio program with a content-  
11 indicating information signal.

12 Figure 47 is a flowchart showing the operation of a computer controlled via  
13 software to enable a remotely located VCR to obtain a commercial skip VCR recording  
14 feature in accordance with the present invention.

15 Figure 48 is a flowchart showing the operation of a computer controlled via  
16 software to enable a remotely located VCR to obtain another version of the commercial  
17 skip VCR recording feature in accordance with the present invention.

18 Figure 49 is a flowchart showing the operation of a computer controlled via  
19 software to enable a remotely located VCR to playback a recorded program with the  
20 commercial skip feature in accordance with the present invention.

21 Figure 50 is a flowchart showing the operation of a computer controlled via  
22 software to enable TV viewing autopilot features in accordance with the present  
23 invention.

24 Figure 51 is a flowchart showing the operation of a computer controlled via  
25 software to enable a commercial rebound feature in accordance with the present  
26 invention.

27 Figure 52 is a flowchart showing the operation of a computer controlled via  
28 software to enable parental control features in accordance with the present invention

29 Figure 53 is a flowchart showing the operation of a computer controlled via  
30 software to enable additional parental control features in accordance with the present  
31 invention.

32 Figure 54 is a flowchart showing the operation of a computer controlled via  
33 software to enable a voice-activated child monitor feature in accordance with the present  
34 invention.

35 Figure 55 is a flowchart showing the operation of a computer controlled via  
36 software to enable a security alert feature in accordance with the present invention.

37 Figure 56 is a flowchart showing the operation of a computer controlled via  
38 software to enable scheduling features in accordance with the present invention.

1           Figure 57 is a flowchart showing the operation of a computer controlled via  
2 software to enable a home reference system feature in accordance with the present  
3 invention.

4           Figure 58 is a flowchart showing the operation of a computer controlled via  
5 software to enable an Internet-based alert feature in accordance with the present  
6 invention.

7           Figure 59 is a flowchart showing the operation of a computer controlled via  
8 software to enable an email alert feature in accordance with the present invention.

9           Figure 60(a) is a flowchart showing the operation of a computer controlled via  
10 software to enable duplication of a video or other recorded information by remotely  
11 controlling two or more devices connected with the inventive multimedia network.

12           Figure 60(b) shows a configuration of a set top box for use with the inventive  
13 multimedia network. This multimedia network set top box may be a stand-alone  
14 accessory device, that works in conjunction with a cable set top box made available to  
15 subscribers of a cable television service provider or satellite broadcasting service.  
16 Alternatively, to avoid component redundancy, the components of the cable set top box  
17 video recorder, internet appliance, and/or the satellite set top box can be incorporated  
18 along with the components of the inventive multimedia network set top box and  
19 provided as part of the user's subscription cost (as is done with a typical cable or  
20 satellite service).

21           In accordance with this aspect of the invention, a network signal is received  
22 from a coaxial or other home network signal source. As described herein, this network  
23 signal source includes the TV channels that are allotted to the cable television channels.  
24 Since different cable television providers make use of different channels, the present  
25 invention includes local channels that are outside the frequency range allotted to  
26 television channels. Thus, the network signal source may include local channels that  
27 are outside the allotted television channels. To allow a user in one room to control a  
28 device (such as the present set top box) from another room, computer and device  
29 control signals are also included in the network signal source as described herein. To  
30 allow the CPU or the present set top box (or a microprocessor 22 or CPU of another  
31 computer or device connected to the network) to control appliances and devices  
32 remotely, the control signals included in the network signal include device control  
33 signals as described herein.

34           A Video PIP generator under the control of the CPU receives the local television  
35 channels as well as the television channels that are provided by the cable television  
36 provider. A number of tuners can be included to tune in two or more cable (or  
37 broadcast or satellite) television channels at once. The CPU controls a local channel  
38 selector that selectively connects the demodulated audio and video signals of the local  
39 channels from the local channel filters and feeds them to the PIP generator. The

1 demodulated audio and video signals can also be remodulated to, for example, channels  
2 3 or 4 (or some other channel) for display on a conventional TV through a direct coaxial  
3 connection or via a connection with a VCR or other video device connected to the TV.

4 The output of the PIP generator, as well as other output from devices such as  
5 the VCR or DVD player, are received by local television channel generators, which in  
6 this embodiment each generate a television channel that is outside the allotted TV  
7 channels. It is to be noted that one or more of the local television channels can be  
8 carried by frequencies that are within those allocated to the television band, while others  
9 are outside the band. This will enable any TV, VCR, etc. to tune one or some of the  
10 local channels directly, while a set top box or other device that includes the local  
11 channel tuners for outside the band is needed to tune in others. As an example, the  
12 network set top box shown here can have the output of its PIP generator modulated to  
13 local TV channels 3 or 4 for display on a TV directly connected to the set top box, or  
14 connected through another device such as a VCR. And/or the PIP generator output can  
15 be modulated to a local channel that is within the range allotted to the TV band, but is  
16 unused by the cable provider or usually not viewed by the user. This local channel can  
17 be injected into the network source signal so that any TV or VCR or other video device  
18 can tune it in directly. At the same time, the video devices, such as VCRs, DVDs, etc.  
19 connected to the network can have their outputs modulated to the TV channels that are  
20 outside the allotted TV band. The output of these devices is displayed on remote TVs  
21 by tuning in the local channel of the remote set top box output (which is under the  
22 remote control of the user located where the remote TV is). By this configuration, only  
23 one local TV channel has to be "taken" from the allocated TV band, while still allowing  
24 any display connected to the network to display the output of any other device  
25 connected to the network (provided that the output of the other device is available for  
26 tuning in by the network set top box. To accommodate two or more simultaneous users  
27 of the output of the network set top box, two or more such set top boxes can be  
28 provided on the network (each individually addressed), or a single network set top box  
29 can be configured to be capable of creating separate PIP output that is modulated to  
30 separate local TV channels (along the lines of the multiple monitor outputs from a single  
31 computer as described herein).

32 Figure 60(c) shows an inventive wireless display terminal for use within range  
33 of a multimedia network identified on the network via addressable handshake exchange,  
34 and for use outside the range of the network for use as a stand-alone personal digital  
35 assistant, pager, cellular telephone, etc.

36 Figure 60(d) shows an inventive wireless display terminal in use for controlling  
37 devices connected with the multimedia network through control signals communicated  
38 via a central computer.

1           Figure 60(e) shows an inventive wireless display terminal connected with a  
2           central computer of an inventive multimedia network having multiple computer display  
3           local channels.

4           Figure 60(f) shows a variety of wireless display terminals connected and  
5           communicating with each other through control signals via a central computer;

6           Figure 60(g) shows a plurality of wireless display terminals in use in a class  
7           room setting.

8           Figure 60(h) shows a wireless display terminal connected with a multimedia  
9           network having the capability of displaying TV (NTSC) and high-definition (computer  
10          monitor, HDTV) display images.

11          Figure 60(i) illustrates a home multimedia network that connects with display,  
12          input and control devices throughout the home, and that communicates with a computer  
13          system located in a vehicle node when the vehicle is in the home garage.

14          Figure 60(j) illustrates a home multimedia network having content input  
15          received through Internet, satellite, cable television, phone line and the like at a central  
16          computer and distributed via bridge circuits throughout the home via coaxial cable,  
17          phone line and electrical wiring networks.

18          Figure 61 illustrates a child's toy having sensors and input mechanisms used for  
19          communicating with a remote computer via a wireless transmission and reception  
20          circuitry and display output and toy movement controlled in response to control signals  
21          originating from the computer. The inventive toy utilizes actuator wires made from a  
22          shape memory alloy (SMA). A SMA exploits a shape memory phenomenon that occurs  
23          in certain alloys, such as alloys in the nickel-titanium family. An example of an SMA  
24          actuator wire is manufactured by Dynalloy, Inc. of Irvine, CA and sold under the  
25          trademark Flexinol. When heated, the SMA actuator wires contract and can exert  
26          considerable pulling force as their length shortens. Upon cooling, the SMA actuator  
27          wires relax back to their original length. One way of heating the SMA actuator wires is  
28          to pass an electrical current through them. The inventive toy utilizes the contraction of  
29          the SMA actuator wires heated by a controlled current flow to actuate the mouth or  
30          appendages (or other moving parts) of the toy in response to control signals transmitted  
31          from the computer. The control signals may be generated by the computer in response  
32          to a sensed condition sensed by sensors onboard the toy (or externally disposed) and  
33          transmitted wireless to the computer.

34          The inventive toy includes sensing means for sensing a change of state of an internal or  
35          external condition. Transmitting means transmits a wireless signal in response to the  
36          change of state to a remotely located computer. The remotely located computer has toy  
37          signal receiving means for receiving the wireless signal transmitted from the toy. The  
38          transmitting means is effective for transmitting audio, video, switch, sensed data and  
39          computer control signals generated by the toy. The sensing means may comprise a

1 microphone for sensing a audio condition change of state; a CCD camera for sensing a  
2 video condition change of state; a pressure sensitive switch for sensing a pressure  
3 condition change of state; a light for sensing a light level condition change of state; a  
4 motion sensor for sensing a motion condition change of state; a infrared sensor for  
5 sensing an infrared signal condition change of state; comprises a thermal sensor for  
6 sensing a thermal condition change of state; and the like.

7 The inventive toy may further comprise computer generated signal receiving means for  
8 receiving a wirelessly transmitted computer-generated signal. The computer-generated  
9 signal may comprise at least one of a control signal, audio signal, video signal, and data  
10 signal. A speaker and/or video display may be included with the toy for receiving and  
11 displaying the computer-generated audio signal and video signal. The computer-  
12 generated audio and video signal may be transmitted on a local channel, and the toy may  
13 include tuning means for tuning in the local channel.

14 The computer can generate a device control signal for use in controlling external  
15 devices, such as televisions, VCRs, home automation device, set top boxes, DVD  
16 players and the like. The control of these devices may be via control signals generated  
17 by the computer in response to voice or pressure switch commands inputted from a user  
18 via the toy. The toy may be used to transmit the control signals to the device (or the  
19 control signals can be transferred through the network as described herein.) If the toy  
20 is to transmit the control signals to the device, Converting means 36 may be provided  
21 with the toy for converting the received device control signal into an infrared diode  
22 driving signal. An infrared transmitting diode receptive of the infrared diode driving  
23 signal emits an infrared signal effective for controlling the remotely located device. The  
24 toy may include a microprocessor 22 or other control circuit with the ability to generated  
25 the device control signals without communication with the external computer.

26 The receiving means may receive a wirelessly transmitted computer-generated toy  
27 control signal. This computer-generated toy control signal is generated by the computer  
28 in response to the change of state of an internal or external condition sensed by the toy  
29 and transmitted to the computer. Actuating means may be provided that is receptive of  
30 the computer-generated control signal for actuating a movable part of the toy. The  
31 actuating means may include a memory alloy element capable of undergoing a reversible  
32 change in shape in response to heating; a power control circuit for controlling the  
33 application of electrical power to heat the memory alloy element; and a power source.

34 The actuating means further includes a thermal sensor for sensing the temperature of the  
35 memory alloy element. Thus, a relatively inexpensive toy can be enabled with the  
36 computational power of a powerful desktop computer.

37 At the computer end, toy interfacing means is associated with the computer system  
38 including computer display local channel generating means; computer generated toy and  
39 device control, audio, video and data signal transmitting means; toy generated audio,

1 video, switch and sensed data computer control signal receiving means. By sensing the  
2 conditions of the toy and transmitting this sensed data to the computer, a number of  
3 useful attributes can be enabled for the toy. For example, by sensing the tilt and motion  
4 of the toy the controlled movement via the actuating means can be accomplished under  
5 the control of the remotely located computer, enabling artificial intelligence or other  
6 software algorithms to effect attributes to the toy that would otherwise be too  
7 expensive, complicated or bulky to implement via on-board toy systems.

8 Figure 62(a) is a block diagram showing a bridge circuit for use with the  
9 inventive multimedia network for enabling simultaneous two-way audio, video, data  
10 and control signals generated by various devices connected to the network to transmit  
11 over hard wire networks such as coaxial, phone, electrical and data line as well as for  
12 the wireless transmission of such signals. In accordance with this aspect of the  
13 invention the bridge circuit includes Wireless signal transmitting means 86 for  
14 transmitting at least one of audio, video, data and control signals originating from  
15 devices connected via a hard-wired portion of a multimedia network to wireless  
16 devices. The wireless devices may include the inventive display terminal, a notebook  
17 computer having the inventive wireless expansion module installed, the inventive  
18 wireless personal digital assistant and the like.

19 Wireless signal receiving means receives at least one of audio, video, data and control  
20 signals originating from the wireless devices. Channel tuning means 90 tunes a channel  
21 comprising at least one of the audio and video signals originating from devices  
22 connected via a hard-wired portion of a multimedia network for transmission to the  
23 wireless device. The device connected via the hard-wired portion include VCRs,  
24 computers, DVD players, video recorders, set top boxes, satellite receives, home  
25 automation units, appliances, stereos, telephone systems, and the like.

26 Connecting means connects the hard-wired portion of the multimedia network to the  
27 wireless signal receiving means so that said at least one of audio, video, data and  
28 control signals originating from the wireless devices can be transmitted to and received  
29 by the devices connected via the hard-wired portion. The connecting means includes  
30 signal transmission lines, combiners/splitters, diode and diode-type circuits, filter  
31 circuits, amplifying circuits, signal conditioners and the like for making a suitable  
32 connection between and among devices connected on coaxial, phone line, electrical  
33 power line, and data line hard-wire networks, as well as wireless networks and  
34 devices.

35 The connecting means may also include amplifying means for amplifying at least one of  
36 said at least one audio, video, data and control signals originating from the wireless  
37 devices and/or from the hard-wired connected devices. The connecting means may  
38 further include impedance matching means for matching the impedance at least one of  
39 said at least one audio, video, data and control signals.

1 Incoming control signal detecting means 94 detects control signals received from the  
2 wireless devices. Controlling means controls channel tuning means 90 to tune in a  
3 channel available for transmission from the network depending on the detected control  
4 signal. Thus, the wireless device is capable of controlling which channel from a  
5 possibly large selection of cable, satellite, local device, local computer channels to tune  
6 in for transmission to the wireless device (alternatively, the wireless device can include  
7 the tuner onboard, and the signal transmitted to it from the network may include all or a  
8 portion of the available channels).

9 The inventive bridge circuit includes local channel generating means for generating a  
10 wireless device local channel comprising at least one of the audio and video signals  
11 received by the wireless signal receiving means from the wireless device. The local  
12 channel generating means may comprise modulating means for modulating said at least  
13 one of the audio and video signals by a carrier channel frequency tunable by at least one  
14 device connected to the network. The carrier frequency may be within the range allotted  
15 for television channels, or outside that range.

16 The wireless signal transmitting means 86 can include a microwave frequency  
17 transmitter for transmitting at least one microwave frequency audio, video, control and  
18 data signal originating from the wireless device. The frequency may be within the 900  
19 MHz and 2.4 GHz bands available for local short distance communication.

20 Incoming control signal detecting means 94 detects control signals received from the  
21 wireless devices. The control signals can be generated by the wireless device to control  
22 the computer and other device connected to the network directly (such as through the  
23 use of a universal remote control signal generator or algorithm). Alternatively, the  
24 control signals can be directed only for controlling a centralized computer, and the  
25 centralized computer can generate device control signals for indirect control of devices  
26 connected to the network by signals originating from the wireless device. The  
27 controlling means may control the local channel generating means to generate the  
28 wireless device local channel depending on the detected control signal, or it may be  
29 indirectly controlled via the central computer.

30 The inventive bridge circuit may also include control or data signal detecting means for  
31 detecting a control or data signal originating from the devices connected via the hard-  
32 wired portion. The Wireless signal transmitting means 86 may include a wireless signal  
33 transmitter for receiving the detected control or data signal and converting it to a radio  
34 frequency control or data signal for transmission to the wireless device. The control  
35 signal or data signal detecting means may include means for converting a direct current  
36 control or data signal to an infrared control or data signal. The Wireless signal  
37 transmitting means 86 may include a wireless signal transmitter including an infrared-  
38 to-radio frequency converter for receiving the infrared signal from the control signal or  
39 data signal detecting means and converting it to a radio frequency for transmission to



1 the wireless device. The control or data signal detecting means may include means for  
2 converting a direct current control or data signal to a radio frequency control or data  
3 signal. The wireless signal transmitting means 86 may include a wireless signal  
4 transmitter for receiving the radio frequency control or data signal for transmission to  
5 the wireless device. The control signal or data signal detecting means may include  
6 filtering means for filtering a direct current control or data signal from other signals  
7 received from the hard-wired portion. The wireless signal transmitting means 86 may  
8 include a wireless signal transmitter for receiving the direct current control or data signal  
9 and converting it to a radio frequency control or data signal for transmission to the  
10 wireless device. The wireless signal receiving means may include a microwave  
11 frequency receiver for receiving at least one microwave frequency audio, video, control  
12 and data signal originating from the wireless device.

13 In accordance with the present invention, wireless devices can be connected via the  
14 bridge circuit that is hard-wire or wirelessly connected to another bridge circuit and  
15 wirelessly connected to another wireless device to connect the two wireless devices.  
16 All of the device control signals may originate from the computer, in response to  
17 computer control signals (e.g., user-inputted remote controls) or computer algorithms  
18 (e.g., scheduling, alerts), and thus the computer will be capable of determining the state  
19 (on, off, channel selection, volume, tape in, time left on tape, etc.) of the various  
20 devices.

21 Figure 62(b) shows an expansion module for use with a pre-existing notebook or  
22 desktop computer to enable simultaneous two-way way audio, video, data and control  
23 signals generated by various devices connected to the network with the pre-existing  
24 computer. The expansion module includes expansion module interfacing means for  
25 interfacing with a computer expansion port. Local channel radio frequency receiving  
26 means is in communication with the computer through the expansion module interfacing  
27 means. The local channel radio frequency receiving means receives a radio signal  
28 channel containing at least one of a video and audio signal originating from an external  
29 audio and/or video signal generating device. A user input interfacing means is provided  
30 for interfacing with a user input device 18 of the computer and generating a user input  
31 signal. For example, the keyboard or mouse input device of the notebook computer is  
32 interfaced with the inventive expansion module through the user input interfacing  
33 means. Control signal generating means generates control signals in response to the  
34 user input signal for controlling the generation of the at least one video and audio signal  
35 originating from the external audio and/or video signal generating device. Control signal  
36 radio frequency transmitting means wirelessly transmits the control signals to the  
37 external audio and/or video signal generating device.

38 The external audio and/or video signal generating device may comprise a second  
39 computer, such as a central computer connected to the network via the inventive bridge

1 circuit, having a wireless transmitter connected to at least one of a video and audio  
2 output of the external audio and/or video signal generating device for generating the  
3 radio signal channel. The external audio and/or video signal generating device may also  
4 be at least one of a video recorder, VCR, phone system, CCD camera, stereo, radio,  
5 CD player, set top box or DVD player having a wireless transmitter connected to at least  
6 one of a video and audio output of the external audio and/or video signal generating  
7 device for generating the radio signal channel.

8 A radio frequency transmitting means transmits at least one of a video and audio signal  
9 to the external audio and/or video signal generating device. The video and audio signal  
10 comprises the output of the computer connected to the expansion module. The  
11 expansion module interfaces with the computer via a single or combination of  
12 expansion ports, such as PCI slots, parallel and serial ports, monitor and video output  
13 ports, speaker and microphone ports, and the like.

14 Computer video signal connecting means 92 connects with a monitor video signal  
15 source of the computer. The radio frequency transmitting means may receive a monitor  
16 video signal of the computer for transmission to the external audio and/or video signal  
17 generating device. A CCD video signal Connecting means connects with a CCD video  
18 signal source associated with the computer. The radio frequency transmitting means  
19 may receive a CCD video signal for transmission to the external audio and/or video  
20 signal generating device. Switching means may be provided for switching between the  
21 output of the Computer video signal connecting means 92 and the CCD video signal  
22 Connecting means and generating a video source output. The radio frequency  
23 transmitting means the video source output of the Switching means for transmission to  
24 the external audio and/or video signal generating device.

25 Figure 62(c) shows a prototype configuration demonstrating the feasibility of  
26 the inventive bridge circuit and expansion module shown in Figures 62(a) and 62(b).

27 Figure 62(d) shows an alternative embodiment of the inventive expansion  
28 module including a removable video/audio/control signal transmitter. In accordance  
29 with this embodiment of the inventive expansion module, interfacing means is  
30 provided for interfacing with a computer expansion port. Local channel radio  
31 frequency receiving means in communication with the computer through the expansion  
32 module interfacing means receives a radio signal channel containing at least one of a  
33 video and audio signal originating from an external audio and/or video signal generating  
34 device. User input interfacing means interfaces with a user input device 18 of the  
35 computer and generating a user input signal. Control generating means generates  
36 control signals in response to the user input signal for controlling the generation of the  
37 at least one video and audio signal originating from the external audio and/or video  
38 signal generating device. Control signal radio frequency transmitting means wirelessly  
39 transmits the control signals to the external audio and/or video signal generating device.

1 A removable signal transmitter is provided including at least one of a CCD camera,  
2 microphone and control signal generator; an expansion module interface for removably  
3 connecting the removable signal transmitter with the expansion module. The removable  
4 signal transmitter may be used to control the external computer and device (directly or  
5 through the various network connections described herein), and may be used to control  
6 the computer connected with the inventive expansion module. The video and/or audio  
7 signal transmitted from the removable signal transmitter may be received and displayed  
8 by the devices connected to the network, and/or may be received and displayed by the  
9 computer connected with the expansion module.

10 Computer video signal connecting means 92 can be provided for connecting with a  
11 monitor video signal source of the computer. Switching means may be included for  
12 switching between the output of the Computer video signal connecting means 92 and  
13 the removable signal transmitter and generating a video source output.

14 Figure 63(a) illustrates an inventive home or office network configuration,  
15 comprising a home or office network module connected to at least one I/O port and a  
16 monitor port of a computer a second network module connected at a multimedia device  
17 (VCR).

18 Figure 63(b) is a block diagram illustrating a configuration of a multimedia  
19 device transceiver 32 network module and a computer transceiver 32 network module.

20 Figure 63(c) illustrates an inventive home or office network configuration  
21 having a wireless network communication with a wireless display terminal wireless  
22 display terminal via at least one antenna node device directional antenna coax faceplate.

23 Figure 63(d) is a block diagram illustrating a configuration of the home or office  
24 network with a wireless signal communication between the wireless display terminal  
25 and the computer transceiver 32 network module via the directional antenna coax  
26 faceplate.

27 Figure 63(e) illustrates the use of the inventive antenna node device directional  
28 antenna coax faceplate for creating a clear consistent wireless signal within a networked  
29 home or office. Directional antennas are located throughout the home, thus creating a  
30 multi-path for the signal and reducing the problems of sending and receiving antennas  
31 orientation and distance. The problems of multi-path cancellation nodes can be  
32 addressed by employing antenna diversity, that is, providing a pair of antenna members  
33 separated by an appropriate distance so that if one antenna is located in a cancellation  
34 node, the other is likely to not be located in a cancellation node.  
35 Our goal is to create a controllable, high security, low emission, clear and consistent  
36 wireless signal zone anywhere desired within the office or home. Our focus is on network-  
37 enhancing devices we are calling antenna node devices 200. antenna node devices 200 are  
38 antenna nodes that connect with pre-existing wire networks and act as a bridge between  
39 wireless devices and the hardwire network.

1 The use of the pre-existing wire network creates an efficient and effective transmission path  
2 for connectivity between the antenna node devices 200 and devices connected to the coax.  
3 The use of wireless network components creates the opportunity for mobility and avoids  
4 the problems associated with installing new wires.  
5 In the home environment, the antenna node devices 200 should be able to work with a  
6 typical pre-existing coax cable network. This will require the ability to convert a wireless  
7 2.4 Ghz signal to 900 Mhz (or less) so that the signal will travel well through splitters on  
8 the network.  
9 In the office environment, the antenna node devices 200 work with a typical Ethernet  
10 network, allowing a wireless Ethernet device to access the wired Ethernet.  
11 Direct current power is injected onto the signal line (+) and the shielding (-) of the coax  
12 cable from an external source. DC filtering (capacitor) may be needed for the blocking  
13 interference with the audio/video and data signals carried on the coax.  
14 The inventive system overcomes the problems of creating a computer and/or A/V network  
15 within a pre-existing home or office environment. The pre-existing wire network provides a  
16 great transmission path for networking devices, but usually terminals to this wire network  
17 are not conveniently available. Wireless networking systems avoid the terminal issue, but  
18 signal attenuation due to building materials and other factors limits the wireless network.  
19 Of course, one solution would be to simply boost the transmitted signal strength.  
20 However, this approach would create undesired security, interference and regulatory  
21 issues. Realizing that the installation of new wires is often not practical, the present  
22 invention provides a hybrid network solution that combines new wireless devices with pre-  
23 existing infrastructure, such as cable television (home) or Ethernet (office) wire networks.  
24 The inventive networking solution creates a controllable "zone of coverage" of wireless  
25 network signals, and at the same time makes the audio, video and data carried by these  
26 signals available by devices connected directly to the coax. For example, in the case of a  
27 coax network, antenna node devices 200 allow the coax to be used as a transmission  
28 medium to extend the range (and reduce the required transmission source power output) of  
29 the wireless signal.  
30 The antenna node devices 200 will receive a 2.4 GHz signal originating from a wireless  
31 transmitting source, amplify and down convert the signal to 900 Mhz, and inject the 900  
32 Mhz signal onto the coax network. The antenna node devices 200 will also receive a 900  
33 Mhz signal from another antenna node device or a 900 Mhz transmitting source, amplify  
34 and up convert it to 2.4 GHz, and then transmit the 2.4Ghz signal to a wireless receiving  
35 device. The antenna node device is powered from a low voltage DC source injected onto  
36 the coax, with onboard controlling means to control the amplification level at each antenna  
37 node device so that only as much of a signal needs to be radiated as is required for clear  
38 reception by a particular receiving device.

1 Very often the home computer is not located near a terminal of this coax network. The  
2 computer network module creates an analog and/or digital wireless computer signal from,  
3 for example, the computer monitor and speaker output (analog) or through a USB, serial or  
4 parallel port (digital). This wireless computer signal is transmitted to a antenna node device  
5 where it is injected onto the coax network. The computer signal is then received by a TV  
6 network module and converted to a local television channel that can be tuned in by any  
7 television connected to the coax network. Further, another antenna node device receives  
8 the computer signal and re-transmits it as a wireless signal to a receiving device, such as the  
9 wireless display terminal (wireless display terminal). As shown, a second computer may  
10 be networked to the first computer (wireless digital data) via the antenna node devices 200  
11 and the pre-existing coax. Thus, the computer monitor and speaker output is available on  
12 any television in the home, and is wirelessly available as a relatively low emission  
13 anywhere in the home. Also, the computer can be network with other digital devices  
14 anywhere in the home.

15 As an example, if a computer is located in a room at one end of the house (with or without a  
16 coax terminal), in accordance with the present invention (1) transmit a wireless carrier  
17 frequency signal containing audio, video and data to a antenna node device, (2) convert the  
18 signal if necessary to a carrier frequency that travels over the home coax network without  
19 interfering with the cable television channels), (3) receive the signal by another antenna  
20 node device somewhere else on the coax network, (4) convert the signal back to the original  
21 wireless carrier frequency, and (5) emit the wireless signal via a directional antenna so that  
22 it can be received by another wireless device. The use of the wire network as a  
23 transmission path between rooms allows the radiated power level to be kept low  
24 everywhere in the home, and still have a clear and consistent signal available any where in  
25 the home (and yard).

26 As another example, a pre-existing wired Ethernet network is installed on a few of the  
27 computers in an office. Typically, adding additional computers to this Ethernet network  
28 would require the expense and difficulty of stringing new wires. However, with the hybrid  
29 wired/wireless networking solution created by the antenna node devices 200, additional  
30 computers can be connected very easily.

31 In many home installations there is no one wired network available that can carry data from  
32 a source location (in this case, a computer) to any room in the home. Wireless rf  
33 networking systems are less than adequate due to attenuation of the rf signal within the  
34 home because of, for example, the absorption and reflection of the rf signal when it  
35 encounters typical home building materials such as drywall, foil-backed insulation, concrete  
36 block, etc. Simply boosting the antenna power output from the point source of the signal  
37 (in this example, the location of the computer) to the receiving antenna (in this case, the  
38 mobile wireless display terminal wireless display terminal) is often not an effective  
39 solution. For such point-to-point transmission to be effective, the signal power may have

1 to be boosted to a level that exceeds the maximum FCC (or other regulatory body)  
2 limitations. Also, the boosting of the antenna output may be undesirable in situations  
3 where the signal will interfere with other devices, or be susceptible to eavesdropping by  
4 neighbors, etc.

5 To overcome this problem, a combination of antenna node device antenna nodes can be  
6 installed at suitable locations throughout the home. A video signal (can be any combination  
7 of data, video, audio, control, etc.) originating from a computer is injected onto a coax  
8 cable network in the home. This signal is carried over the coax network to a coax network  
9 antenna node where it is amplified and wirelessly transmitted to a powerline connected rf  
10 repeater unit. The signal carried on the coax may be up converted or down converted to a  
11 suitable carrier frequency for improved transmission over the coax, and then up converted  
12 or down converted, as necessary, for rf transmission between the coax network antenna  
13 node and the powerline connected rf repeater unit. The powerline connected rf repeater unit  
14 may be a passive device which receives the rf signal from the coax antenna node and  
15 amplifies and retransmits it as an rf signal (up converting and down converting can be  
16 performed by a mixer associated with the powerline connected rf repeated if needed). The  
17 rf signal emitted by the powerline connected rf repeater is received by a phoneline antenna  
18 node which is within range of the transmitted signal. The signal may again be amplified,  
19 down converted or up converted, as needed so that it can be carried by the phoneline wired  
20 network (without interfering with other signals carried on the network such as voice, data,  
21 etc.). This signal is received at a second phoneline antenna node, where again it can be up  
22 converted, down converted, amplified (or attenuated) as needed so that it is optimally  
23 conditioned for transmission to the wireless display terminal wireless display terminal  
24 without exceeding regulatory power limits, and with less susceptibility to unauthorized  
25 reception.

26 In this way, the signal originating from the computer is transmitted over the pre-existing  
27 hardwired home networks (coax and telephone) with a powerline connected rf repeater  
28 bridging the two wired networks, for ultimate reception by a wireless display terminal. In  
29 this example, the wireless display terminal is located at a room in the home where direct  
30 point-to-point transmission from the computer to the wireless display terminal would have  
31 been inadequate due to signal attenuation. Of course, this example is for illustrative  
32 purposes and, for example, the powerline connected rf repeater unit may not be necessary  
33 (that is, the bridging of the coax and phoneline networks could be direct between their  
34 respective antenna nodes).

35 Figure 64(a) is a front view of an embodiment of the inventive antenna node  
36 device directional antenna coax faceplate.

37 Figure 64(b) is a perspective view of the embodiment of the inventive antenna  
38 node device directional antenna coax faceplate shown in Figure 64(a).

1           Figure 64(c) is an isolated perspective view of a directional antenna and coax  
2 connector of the inventive antenna node device directional antenna coax faceplate shown  
3 in Figure 64(a).

4           Figure 64(d) is an isolated side view of a directional antenna and coax connector  
5 of the inventive antenna node device directional antenna coax faceplate shown in Figure  
6 64(a).

7           Figure 65(a) is an isolated side view of the directional and coax connector of the  
8 inventive antenna node device directional antenna coax faceplate shown in Figure 64(a)  
9 connected to a coax network. the controllable frequency filter keeps the channels that  
10 the user does not want emitted wirelessly from being transmitted to the directional  
11 antenna. used to keep "secure" data channels from exiting the coaxial network, but  
12 controllable so that these channels can be transmitted when the user desires a wireless  
13 connection the secure channels. Alternatively, the filter can be preset with some  
14 channels, say channel 1 of the 2.4GHz band always blocked from transmission to the  
15 wireless antennas and otherwise out of the home hardwired networks. This channel is  
16 then the secure channel, with data being carried by this channel's frequency being block  
17 from exiting the home's coax or other hardwire networks. Further, the data on the  
18 secure channel can be handshake packetized and/or encrypted, with only those devices  
19 that have the appropriate handshake or encryption key able to read the data

20           Figure 65(b) is block diagram of an embodiment of the directional and coax  
21 connector of the inventive antenna node device directional antenna coax faceplate shown  
22 in Figure 65(a). In response to addressed control signals, the controlling means  
23 controls which channels are transmitted via the directional antenna, and at what power  
24 level the channels are transmitted. If necessary, a capacitor keeps power steady even  
25 when dc control signals are transmitted. Supplied low voltage power is received from  
26 the coax (injected by one of the devices on the network) to the circuit components.

27           Figure 65(c) illustrates a home or office networked home having antenna node  
28 devices 200 (the inventive antenna node device 200) connected at various terminal ends  
29 of a pre-existing coax network, and further illustrating the inventive capabilities of  
30 wireless signal attenuation within the zone of coverage. When the wireless display  
31 terminal (the inventive wireless display terminal) is stationary, such as when the user is  
32 sitting on a couch, the power output of the "best" antenna is reduced to a level that is  
33 just above the level required for a clear, consistent signal. The power output of the  
34 other antennas can be attenuated fully, unless they are communicating with other  
35 devices

36           Figure 65(d) illustrates a home or office networked home having antenna node  
37 devices 200 connected at various terminal ends of a pre-existing coax network, and  
38 further illustrating the inventive capabilities of wireless signal handoff between two  
39 antenna node devices 200 within the zone of coverage. When the wireless display

1 terminal is moved to another room, a "hand-off" occurs between the antenna in  
2 previous room and the antenna in the next room.

3 Figure 65(e) illustrates a home or office networked home having a combination  
4 of coaxial antenna node devices 200 and phoneline antenna node devices 200 installed,  
5 along with a powerline connected rf repeater unit 202, for creating a zone of coverage  
6 throughout a home. In many home installations there is no one wired network available  
7 that can carry data from a source location (in this case, a computer) to any room in the  
8 home. Wireless rf networking systems are less than adequate due to attenuation of the  
9 rf signal within the home because of, for example, the absorption and reflection of the  
10 rf signal when it encounters typical home building materials such as drywall, foil-  
11 backed insulation, concrete block, etc. Simply boosting the antenna power output from  
12 the point source of the signal (in this example, the location of the computer) to the  
13 receiving antenna (in this case, the mobile wireless display terminal wireless display  
14 terminal) is often not an effective solution. For such point-to-point transmission to be  
15 effective, the signal power may have to be boosted to a level that exceeds the maximum  
16 FCC (or other regulatory body) limitations. Also, the boosting of the antenna output  
17 may be undesirable in situations where the signal will interfere with other devices, or be  
18 susceptible to eavesdropping by neighbors, etc. To overcome this problem, a  
19 combination of the inventive antenna node device antenna nodes can be installed at  
20 suitable locations throughout the home. In the example shown in Figure 65(e), a video  
21 signal (can be any combination of data, video, audio, control, etc.) originating from a  
22 computer is injected onto a coax cable network in the home. This signal is carried over  
23 the coax network to a coax network antenna node where it is amplified and wirelessly  
24 transmitted to a powerline connected rf repeater unit 202. The signal carried on the  
25 coax may be up converted or down converted to a suitable carrier frequency for  
26 improved transmission over the coax, and then up converted or down converted, as  
27 necessary, for rf transmission between the coax network antenna node and the  
28 powerline connected rf repeater unit 202. The powerline connected rf repeater unit 202  
29 may be a passive device which receives the rf signal from the coax antenna node and  
30 amplifies and retransmits it as an rf signal (up converting and down converting can be  
31 performed by a mixer associated with the powerline connected rf repeated if needed).  
32 The rf signal emitted by the powerline connected rf repeater is received by a phoneline  
33 antenna node which is within range of the transmitted signal. The signal may again be  
34 amplified, down converted or up converted, as needed so that it can be carried by the  
35 phoneline wired network (without interfering with other signals carried on the network  
36 such as voice, data, etc.). This signal is received at a second phoneline antenna node,  
37 where again it can be up converted, down converted, amplified (or attenuated) as  
38 needed so that it is optimally conditioned for transmission to the wireless display  
39 terminal wireless display terminal without exceeding regulatory power limits, and with



1 less susceptibility to unauthorized reception. In this way, the signal originating from  
2 the computer is transmitted over the pre-existing hardwired home networks (coax and  
3 telephone) with a powerline connected rf repeater bridging the two wired networks, for  
4 ultimate reception by a wireless display terminal. In this example, the wireless display  
5 terminal is located at a room in the home where direct point-to-point transmission from  
6 the computer to the wireless display terminal would have been inadequate due to signal  
7 attenuation. Of course, this example is for illustrative purposes and, for example, the  
8 powerline connected rf repeater unit 202 may not be necessary (that is, the bridging of  
9 the coax and phonline networks could be direct between their respective antenna  
10 nodes).

11 Figure 66(a) is a side view illustrating a antenna node device having a  
12 directional antenna disposed at a signal optimizing angle. The directional antenna may  
13 be preset at an angle so that the orientation of the radiation emitting/receiving element  
14 is appropriate of the best signal transmission between the emitting/receiving element  
15 located at the faceplate height (

16 Figure 66(b) is a perspective view of the antenna node device shown in Figure  
17 66(a).

18 Figure 66(c) is a perspective view of a antenna node device accessory antenna  
19 system for connecting with a pre-existing coax faceplate.

20 Figure 66(d) is a block diagram illustrating a antenna node device configuration  
21 comprising a wireless video/audio/data and control signal circuit for use within the  
22 inventive home or office network.

23 Figure 66(e) ) is a block diagram illustrating a antenna node device  
24 configuration comprising a wireless video/audio/data and control signal circuit for use  
25 within the inventive home or office network, including a phone jack connection and a  
26 voltage peak filter for detecting dc control and data signals included as voltage peaks  
27 superimposed on a constant dc power supply signal.

28 Figure 66(f) is a graph illustrating the dc control and data signals included as  
29 voltage peaks superimposed on a constant dc power supply signal.

30 Figure 66(g) illustrates an obverse side of a printed circuit board construction of  
31 the inventive circuit for an embodiment of the antenna node device, the circuit including  
32 a rf signal amplifier and rf mixer for optimizing the signal transmission carried over the  
33 coax network, while allowing for a wireless signal within a suitable bandwidth (e.g.,  
34 2.4 GHz).

35 Figure 66(h) illustrates a reverse side of the printed circuit board construction of the  
36 inventive circuit shown in Figure 66(g).

37 Figure 66(i) is a perspective view of a antenna node device accessory antenna system  
38 for connection with a pre-existing coax faceplate.

1 Figure 66(j) is a perspective view of a antenna node device stand-alone antenna system  
2 for connection with a pre-existing coax terminal connector.  
3 Figure 66(k) is a perspective view of a antenna node device directional antenna coax  
4 faceplate for replacement of a pre-existing coax faceplate.  
5 Figure 66(l) is a block diagram illustrating a prototype construction embodiment of the  
6 inventive home or office network.  
7 Figure 67(a) is a flowchart showing the operation of an inventive analog scrambler. The  
8 inventive analog scrambler can be used to add data security between networked devices,  
9 wired and wireless. If two or more transceiver 32 pairs are simultaneously using the  
10 available carrier bandwidth for communication, the central computer (microprocessor  
11 22, Gateway device, etc.) can calculate the frequency adjustment and sync signal timing  
12 values so that there is no signal interference. The use of the handshake value received  
13 by the mobile terminal (or other device) allows a single central computer to effectively  
14 control the analog scrambling for two or more different data streams. For security, the  
15 two devices can be hardwired together for the exchange of the handshake value and  
16 frequency adjustment function. The transmission of the sync signal may obviate the  
17 need for a timing function.  
18 Figure 67(b) is an example of the sync signal and frequency adjustment in accordance  
19 with the inventive analog scrambler. Frequency  $f$  = the center of the carrier wave band  
20 which is about 2 Ghz +/- some function -determined value where the value of  $f$  is  
21 within the range of the 2.4 Ghz allotted channels. The frequency band can be any of  
22 the licensed or unlicensed frequency bands available, most notably, the frequencies  
23 around 900MHz, 2.4GHz and 5 GHz.  
24 Figure 68(a) is a block diagram illustrating a antenna node device configuration for use  
25 with a phone line network, and including device locating circuitry for use in  
26 determining the location of devices within the inventive home or office network. In  
27 accordance with the antenna node devices described herein, two or more antenna  
28 members can be provided, each optimized for a particular frequency range (such as  
29 UHF, VHF, 900 Mhz, 2.4 GHz, 5 GHz, etc.) . In any of the devices (wireless display  
30 terminals, antenna nodes, set top boxes, accessory boxes, etc.) described herein,  
31 antenna diversity can be employed to prevent the problems of multi-path cancellation.  
32 The components of the various configurations of the inventive antenna node can be  
33 provided in any suitable combination, each configuration shown may or may not show  
34 every component that would be in a working version  
35 Figure 68(b) is a block diagram illustrating a antenna node device configuration  
36 for use with a power line network for communicating wireless and hardwired signals  
37 transmitted within the inventive home or office network. The antenna member(s) can be  
38 configured and dimensioned for transmission/reception of various RF frequencies,  
39 including but not limited to the licensed and unlicensed frequencies as designated by the

1 FCC. The controllable filters/amplifiers/attenuators are under the control of a  
2 microprocessor 22 or the central computer so that the power and frequency of the RF  
3 signal emitted from the antenna member(s) is selective. In response to addressed control  
4 signals, the controlling means controls which channels are transmitted via the  
5 directional antenna, and at what power level the channels are transmitted.

6 Figure 69(a) is a flowchart showing the steps of determining the appropriate  
7 signal power transmitted from antenna nodes within the inventive home or office  
8 network;

9 Figure 69(b) is a flowchart showing the steps of determining the location of a  
10 device located within the inventive home or office network. This technique can be used  
11 to find wireless remotes, keyboards, children (with the inventive personal locator),  
12 wireless display terminals, etc. A map of the home can be obtained by bringing a  
13 wireless device to the corner of each room and, through software, noting where the  
14 room corners are (location determined relative to antenna nodes). The radius R of the  
15 identified device and each antenna node can be obtained by determining the delay  
16 between the transmission of the "location finder" handshake from each antenna node(as  
17 controlled by central computer or microprocessor 22) and the reception of the  
18 corresponding location "ping" from the device.

19 Figure 69(c) is a flowchart showing the steps of determining the appropriate  
20 signal power transmitted between antenna nodes and wireless devices within the  
21 inventive home or office network.

22 Figure 69(d) illustrates the determination of the location of a device by detecting  
23 the distance between the device and two or more antenna nodes within the inventive  
24 home or office network.

25 Figure 69(e) is a flowchart showing the steps of using a frame buffer to limit the  
26 display degradation due to the disruption of a video signal transmitted to a device  
27 connected to the inventive home or office network.

28 Figure 69(f) is a flowchart showing the steps of compensating for microwave  
29 oven interference when transmitting data to a device connected with the inventive home  
30 or office network.

31 Figure 69(g) is a flowchart showing the steps of compensating for microwave  
32 or other pulsating interference when transmitting video data to a device connected with  
33 the inventive home or office network.

34 Figure 70(a) illustrates the use of the inventive wireless display device for  
35 displaying Internet and intranet content in external network environments, such as  
36 schools, airports, airplanes, grocery stores and the like. Each wireless display terminal  
37 logs into the network by a handshake (like a cellular telephone). The wireless display  
38 terminal is then allocated a specific "slice" of the available spectrum and transmission  
39 timing - like a mainframe communicating with a bunch of users on dumb terminals.

1 For data such as internet data, a single frame or portion thereof (webpage) is all that  
2 needs to be transmitted to each user before another user can be allocated the  
3 transmission "space". Each user is given a sync code from the Gateway so that his  
4 wireless display terminal knows when to expect the next frame (e.g., webpage)  
5 reception (if there is one ready for him) and so that the Gateway knows when to expect  
6 data (such as hyperlink clicks) from the user. The webpages for the users are buffered  
7 at the Gateway. Preferably, a full page is received and buffered before it is transmitted  
8 to the user. It may be transmitted as a single video frame, with the hyperlinks mapped  
9 in the manner described herein. The user's hyperlink selection is transmitted to the  
10 Gateway in the form of an RF signal containing the grid coordinate which is compared  
11 with the hyperlink map to determine which hyperlink has been clicked. The grid  
12 coordinate can be determined from a "standard" origin, such as the top left corner of the  
13 webpage (the grid can be resized if the page is resized to accommodate page scrolling  
14 and resizing). The data that is transmitted between the wireless display terminal display  
15 and the Gateway consists of video frame-type pages from the Gateway to the wireless  
16 display terminal and hyperlink grid coordinates from the wireless display terminal to the  
17 Gateway. Other data, such as handshake information can be included with the  
18 transmissions to ensure that the Gateway "knows" which wireless display terminal is  
19 communicating with it and so that the wireless display terminal "knows" that it is its  
20 data being received. The handshake information can also be used to enable more  
21 efficient communication between the Gateway and multiple users - optimizes idle time  
22 because data can be sent or received out of sync order. Can also provide prioritization  
23 of communication allowing, for example, a preferred wireless display terminal to gain  
24 Gateway access ahead of others. Otherwise, if a frame is not ready for that user, then  
25 he has to wait until his next "sync time" until he can get another. wireless display  
26 terminals are capable of analog and digital reception. The analog channels may be be  
27 used for "public" data, or when receiving multimedia signals in the home. The digital  
28 reception may be used for encrypted data reception when in the public network, to  
29 allow private web browsing, email, etc. through the Gateways.

30 Figure 70(b) is a flowchart showing the steps of transmitting, receiving and  
31 displaying Internet and intranet content on networked display devices. A start page is  
32 broadcasted from the Gateway for reception by display devices used by users located  
33 within the range of the Gateway network (can be wireless or wired broadcast). The  
34 start page may be, for example, a web browser "portal" page stored on the Gateway  
35 that is the first page transmitted to any display unit when it begins an Internet session or  
36 otherwise wishes to receive information (television channels, intranet content, closed-  
37 circuit video, etc.) from the Gateway source. The start page can include links to  
38 intranet sites (for example, in an airport environment, it may include flight information,  
39 terminal map, driving directions, rental car and airline information, etc.). Some of the

1 intranet data can be refreshed from the Internet connection - i.e. traffic and weather  
2 reports. Since this type of data is likely to be frequently accessed by different user, it  
3 can be cached as part of the intranet data, and periodically refreshed, thus obviating the  
4 need for individual access to certain Internet pages. The Internet-based alert system  
5 described herein can be employed to ensure that "breaking" news from the Internet is  
6 quickly available as intranet data. The start-page can be transmitted on a "public"  
7 channel - available simultaneously to all the display device in the network. Once a  
8 display device sends it first hyperlink request - i.e., the grid coordinates of one of the  
9 hyperlinks on the start page, along with its identifying handshake- a "private"  
10 connection channel is formed between the display device and the Gateway along the  
11 lines described herein, or using known technology such as that employed by cellular  
12 telephone networks. A location, such as an airport, may have multiple Gateways  
13 disposed at locations throughout the airport terminals. As a user moves about the  
14 terminals, the display unit is handed off between the Gateways. Also, frequency  
15 hopping, spread spectrum, encryption, or other suitable techniques, can be used to  
16 transmit secure webpage or other content data. The webpage data can be transmitted as  
17 analog information, rather than digital, since there is little opportunity for digital  
18 compression in the moving picture sense, and thus digital transmission may be too  
19 bandwidth intensive to accommodate numerous simultaneous users. The display device  
20 receives and converts the analog signal (for example, a composite video signal)  
21 containing a frame of a video signal as a web page. Thus, using the NTSC TV  
22 standard as a guide, 6 MHz of analog bandwidth can transmit about 30  
23 webpages/second - allowing for the accommodation of many users from a single  
24 Gateway - particularly if multiple analog transmission channels are available. HDTV or  
25 computer monitor-type resolutions may require additional bandwidth as compared with  
26 the conventional television-type resolution. Sensitive data, such as email, may need  
27 special processing to keep the email private if it is transmitted as an analog video frame.  
28 Or, some data may be transmitted as digital, more bandwidth intensive, signals to  
29 enable digital encryption and other privacy techniques to be employed.

30 Figure 71(a) is a flowchart showing the steps of using Internet-based  
31 information triggers for controlling events within a networked home or office. The  
32 subscriber preferences include the online (Internet, intranet, etc) triggers (stock news,  
33 tv programs, weather alerts, video and telephone alert, with advanced caller id, news  
34 reports, etc.  
35 Also included in the subscriber preferences are the events that are to be occur in the  
36 home in response to the detection of the alerts - turn on certain television(s), turn up  
37 volume, ring telephone (distinctive ring), compose PIP of television and internet  
38 content with computer and turn selected televisions to the local computer channel, etc.  
39 The trigger events are stored on the home's central computer, which protects the

1 subscriber from anyone manipulating the home via a hacked Internet connection (events  
2 can include encryption and password protection). The online triggers are uploaded to  
3 the home or office server and compared with a constantly updated information data base  
4 to determine the occurrence of a subscriber's trigger. When a trigger occurs, the home  
5 or office server notifies the subscribers computer (either through Instant Message-type  
6 communication (constant connections or when the subscriber is logged into the system)  
7 or email-type notification (dial-up connections)). The subscriber's computer can be  
8 programmed to dial up connection and check for email-type notification at certain times.

9 Figure 71(b) is a table showing examples of subscriber-selected online triggers.

10 Figure 71(c) is a table showing examples of subscriber-selected trigger events.

11 Figure 72(a) illustrates six frames of a video stream containing six pages of a web site.

12 In accordance with the present invention, the six frames of the website are transmittable  
13 as video frame data to enable high speed transfer of the entire website via a television  
14 signal transferring system such as cable television. Using, for example, a conventional  
15 NTSC broadcast television channel carrying one page per video frame, the entire six  
16 pages of the website can be transmitted in about .2 seconds. In accordance with the  
17 present invention, the web pages are generated as individual frames of a video stream.  
18 As an example, an NTSC video transmission has a frame rate of about 30 frames per  
19 second. Thus, in accordance with the present invention, the six pages of the website  
20 shown in Figure 72(a) can be transmitted in about two tenths of a second. The static  
21 display information is contained within the display area of the video frame. The  
22 overscan area or the vertical blanking interval (or other displayed and/or non-displayed  
23 area) of the video frame or video signal is used to carry hyperlink and other non-display  
24 information.

25 Figure 72(b) illustrates a blank browser page which is used to navigate through the  
26 downloaded web pages and to make a connection with the Internet to acquire additional  
27 information not included in the transmission. For example, the transmitted web site  
28 may include hyperlinks to additional web pages and web sites which can be accessed  
29 through a modem connection with the Internet. The blank browser page includes a  
30 display area in which is inserted the display information retrieved from the received  
31 video transmission.

32 Figure 72(c) shows the display information contained in Frame1 of Figure1 displayed  
33 within the browser frame window. In accordance with the present invention, the  
34 displayed webpage looks the same as a webpage retrieved from the Internet, although is  
35 has been transmitted at a substantially higher rate of transmission than is available from  
36 a conventional Internet connection.

37 Figure 72(d) illustrates a single frame from the video stream shown in Figure 72(a).

38 The frame includes the display information which is contained within the displayed  
39 image area. The frame also includes the hyperlink and other non-display information

1 which is contained within the non-display portion of the video frame or video signal.  
2 The non-display information shown in Figure 72(d) is, for illustrative purposes,  
3 indicated in English words. However, as is described below, this non-display  
4 information is preferably transmitted in digital form via the use of the available states of  
5 pixel information contained within the video signal. The display information is a static  
6 frame of video data. Thus, in order for the hyperlinks to be activatable, the position  
7 and boundaries of the hyperlink must be determined. Do the hyperlink by order and  
8 reached by tabbing through the hyperlink order, also in the voice recognition system,  
9 the spoken word for the hyperlink and the alternative forms expected to be spoken can  
10 be included in the hyperlink information to enable voice recognition. For example, the  
11 hyperlink "about the company" would include variations of the phrase "about the  
12 company" The non-display information that is contained within the video signal may  
13 include hyperlink information including the link title, image location, the target of the  
14 link, and what operation(s) is to be performed when the link is clicked. For example,  
15 the hyperlink information may include an operation command that changes the color of  
16 all the black pixels to blue when clicked. Thus, once the hyperlink is clicked, all the  
17 black pixels that make up the text of the hyperlink graphic are changed to blue, giving a  
18 visual indication to the user that this hyperlink has been activated. The hyperlink is  
19 activated when the cursor enters within the image location boundaries and the mouse is  
20 clicked. In other cases, for example in the use of a remote control that includes a means  
21 for tabbing through the hyperlinks, the hyperlink is activated when the hyperlink is  
22 tabbed to, and the enter button or other such button on the remote control is clicked.  
23 The image location is relative to some standard landmark on the page such as the top left  
24 corner or other suitable page landmark. The "link to" information for the particular  
25 hyperlink indicates what the target of the hyperlink is. In this case, for example, the  
26 hyperlink with the link title "about the company" is at a specific image location  
27 designated by a rectangle determined by the position of the top left corner and bottom  
28 right corner relative to the page landmark. The link "about the company" when  
29 activated causes the video frame2 in the example shown in Figure 72(a) to be retrieved  
30 from the video memory and its display image is displayed as the next web page. The  
31 non-display display information is deciphered as will be described below and loaded,  
32 for example, into RAM so that this new page's hyperlinks and other non-display  
33 information can be utilized. Other operations can be performed, such as controlling  
34 televisions, communication devices, lights, security systems, and the like, and the links  
35 can be to other internet content or to controlling appliance like VCRs. The hyperlinks  
36 contained in the webpage shown in Figure 72(d) include links to the other webpages  
37 that are shown in Figure 72(a). For example, the link title "fact sheet" when activated  
38 will bring up video frame3 through the operation "goto linked page". Another link  
39 towards the bottom of the page shown in Figure 72(d) is titled "Point Blank Designs".

1 This link when activated performs the operation of opening a new email message with  
2 the email address nycs8@aol.com. The hyperlinks can perform various other  
3 operations typically done by hyperlinks contained in Internet webpages. Further, the  
4 hyperlinks can be used to activate or operate local devices, such as VCRs, telephone  
5 systems, computers, televisions and the like.

6 Figure 72(e) illustrates the various links and their operation that results when the  
7 hyperlinks shown in Figure 72(d) are activated.

8 Figure 72(f) illustrates another series of webpages that are transmitted as video data. In  
9 this case, the web pages consist of a television programming guide. The programming  
10 guide includes a program grid that has television shows that are available on, for  
11 example, a cable television provider's system. In accordance with this aspect of the  
12 invention, the television programming guide can be transmitted to the cable television  
13 subscribers complete with webpages that correspond to the various viewing choices that  
14 are available. The portion of the video signal that is captured by the subscriber's box  
15 can be customized depending on the subscriber's preferences and viewing habits.

16 Thus, for example, a subscriber who is interested in science fiction can have in-depth  
17 webpages captured that pertain to television programs that pertain to this genre.

18 Further, by determining the demographics of the particular subscriber, specific  
19 commercial messages, news reports, advertising incentives and the like and can  
20 captured from the television signal. As shown, the display displayed information for a  
21 page can be send as a single video page. One or more video frames can be used to  
22 carry the corresponding hyperlink and related information. For example, if the page  
23 has a lot of hyperlinks, all the hyperlink data may not fit within the available non-  
24 displayed portion of the television signal associated with that frame. Thus, the link data  
25 can be included in the adjacent video frame both in the display area and the non-display  
26 area.

27 Figure 72(g) shows a web page with the corresponding non-display data included along  
28 with the page. In this case, the non-display data includes the page title "entrypage",  
29 page location "video A1 frame1", and the page reception information. This page  
30 reception information may include the frame number, in this case, 2132507, followed  
31 by the reception date, in this case, 01/15/1999. This page reception information can be  
32 used as the page link designation or otherwise used to keep track of the various frames  
33 of webpage video data that is received. Also included is the element data for the various  
34 graphic elements making up the page. The element data includes the page element title,  
35 the image location, the element order and the element type. Thus, for example, if the  
36 viewer wishes to obtain an editable text clipping from the web page, he can do so by  
37 clicking on the desired text and copying the text image to an OCR program which  
38 would convert the text image into editable text.



1 The type of data for each page element can be included in the page data. For example,  
2 text data can be identified as text, contained within predefined boundaries, so that the  
3 text image can be captured and converted into editable text using an OCD-type program.  
4 Animation or motion video can be included by linking each frame of the animation to  
5 the additional pages containing the other frames. During playing of the animation clip,  
6 each page in the animation series is displayed at the appropriate frame rate, the other  
7 page elements remain constant. If there are two or more pages with video or animation  
8 content, their video content can be combined into a single page. When viewed, the  
9 other page content remains fixed and acts as a mask while the moving image content of  
10 the page is played behind the mask. That is, the mask has a window that lets the video  
11 image content come through. For images that might be "blown up", the image data can  
12 be increased so that the pixel resolution of the blown up image is high. Pixel  
13 information is used to carry binary data, hyperlinks, data types, etc. Pixel state (on/off,  
14 luminosity, color, etc. can be used to convey the information. To decode, the pixel data  
15 is retrieved from the video frame. Video content and TML content can be "pushed",  
16 that is, loaded onto a recording device such as a hard drive day and night or at  
17 appropriate times. This pushed content may be encrypted so that the content provider,  
18 such as a cable company, can charge for the encryption key. The hyperlinks can  
19 include links to video footage stored on the HD, or to be downloaded and stored (such  
20 as television programs that are coming on in the future, PPV or VOD). The hyperlinks  
21 can include links to Internet content, with access to the Internet content initiated with the  
22 link is clicked. The content can include daily newspapers with video linked news  
23 reports, catalogs, etc. with a check to determine the "freshness" of the downloaded  
24 content, only new content needs to be sent.

25 Figure 72(h) shows how the binary video data stream can be conveyed using just the  
26 on/off states of the pixels of the video image. In this case, the bright pixels represent  
27 binary digits 0 and the black pixels represent binary digit 1. Thus, the non-display  
28 information can be transmitted as part of the video information and later determined  
29 from the video information by detecting the bright and dark states of the pixels in serial  
30 order as they are displayed.

31 Figure 72(i) illustrates a video stream containing display page information contained  
32 within the displayed area of the individual video frames, and hyperlink page  
33 information and other non-display page information contained in the non-display area of  
34 the video signal or video page stream. The display information displayed the entire  
35 website page, or a portion of it, as a still frame taken from the received video frame  
36 signal. If the page is larger than a single frame, two or more video frames can be linked  
37 together with the link operation indicating that the browser is to display the pages with  
38 scrollability. The non-display information includes the targets of hyperlinks, page title  
39 and other information. This data can be transmitted as binary information that can be

1 discerned from the pixel information. To retrieve the binary data stream, the state of  
2 each pixel is determined, perhaps in its scan sequence or other predetermined order.  
3 This pixel state is converted into a binary data stream from which is determined the  
4 contained non-display information.

5 In accordance with the present invention, a browser-type computer program is provided  
6 for controlling the display of the html-type documents received as described above.  
7 This browser-type application has a number of advantages over conventional Internet  
8 web browsers, such as Netscape Navigator, Netscape Communicator and Microsoft's  
9 Internet Explorer. The inventive browser-type program requires relatively little  
10 computer memory to operate, making it particularly suitable for relatively inexpensive  
11 PDAs, set top boxes, and other such devices.

12 The videostreaming HTML document format described above can be obtained by  
13 converting other HTML-types of documents, such as those currently found on the  
14 Internet, into the videostreaming HTML document format. Thus, for example, Internet  
15 content can be collected from the Internet as is done conventionally using a desktop  
16 computer, and then this content can be converted into the inventive videostreaming  
17 HTML document format. This videostreaming HTML content can be then transferred  
18 from the desktop computer to, for example, a PDA thereby allowing low memory  
19 capacity devices, such as PDAs to store much larger quantities of Internet content than  
20 conventionally possible. The inventive browser-type program can also be used to  
21 convert other documents into hyperlinked videostreaming HTML documents for  
22 transmission to display devices. In accordance with this aspect of the present  
23 invention, a display device only needs to be able to display a frame (web page) of video  
24 information received from an "Internet or intranet Gateway" device. The display device  
25 does not have to be able to decode html, reconstruct GIF images for display, etc. These  
26 actions are done by the Gateway device. The display device receives the web page as  
27 frame of video (or as a still image) and it is displayed. If the display device includes  
28 buffering means for buffering data, then it can receive "bursts" of content information  
29 from the Gateway device, optimizing data transmission to multiple display devices. To  
30 activate, for example, a hyperlink a cursor location determining means onboard the  
31 display device determine where a superimposed cursor is located relative to the  
32 hyperlinks on the page when the user clicks on a hyperlink. This hyperlink location  
33 information is transmitted to the Gateway device where it is interpreted to determine  
34 which hyperlink the user intends to activate. The activation of the hyperlink by the user  
35 can be performed by other mechanisms, such as tabbing through the links on a page, etc.  
36 The information regarding where a hyperlink is located, what it is linked to, etc. is  
37 maintained by the Gateway thus alleviating the need to have much processing power, if  
38 any, onboard the display device for accessing the Internet or intranet content. Further,  
39 "public" channels can be provided that can be accessed by multiple displays

1 simultaneously for showing, for example, a movie or news report to users within a  
2 network environment such as an airplane, airport or grocery store.  
3 Figure 72(j) illustrates a stream of video data provided along with hyperlink, page  
4 information and other non-videographic page information, with split static videographic  
5 page information provided along with split moving image videographic page  
6 information;  
7 Figure 72(k) shows a block diagram of an inventive display device for use with the  
8 inventive method of transmitting hyperlinked information.  
9 Figure 72(l) illustrates a wireless display device receiving a window of moving image  
10 videographic page information superimposed on a screen of static videographic page  
11 information.  
12 Figure 72(m) shows a PDA-type wireless display device displaying static and moving  
13 videographic page information.  
14 Figure 72(n) shows a blank page of a high speed HTML browser window in  
15 accordance with the prototype FaceSpan software program disclosed herein.  
16 Figure 72(o) shows an internet page having the grid locations of the page's hyperlinks  
17 determined and the page displayed in the browser window shown in Figure 72(n).  
18 Figure 73(a) shows an inventive wireless display terminal capable of displaying  
19 a screen image composed of video data simultaneously received from two or more  
20 wireless sources. The inventive wireless display terminal system includes control  
21 signal generating means for generating control signals for controlling at least one  
22 remotely located data source. The remotely located data sources may be, for example, a  
23 computer, a VCR, DVD, set top box or other multimedia device. As described  
24 elsewhere herein, the remotely located data sources include wireless signal transmitting  
25 devices that emit a wireless signal containing video, audio, and/or data information. A  
26 first wireless data signal receiving means receives a first wireless data signal (for  
27 example, a digital data signal containing internet content from a computer)  
28 Alternatively, the digital data signal can come from a wireless modem connected directly  
29 to wire network, such as a phone line or cable network. In this case, the wireless  
30 display terminal includes means for receiving the Internet content in the form of a  
31 wireless modem signal and creating a screen image dependent thereon, and means for  
32 requesting internet content through the wireless modem.  
33 A second wireless signal receiving means receives a second wireless data signal  
34 (for example, a television channel from a set top box). A video processing device  
35 processes the video information contained in the first and the second wireless data  
36 signal. The video processing device is effective for outputting a composed video signal  
37 containing a screen image composed of a split screen or picture-in-a-picture display  
38 comprised of the video information. Stated otherwise, the video processing device is  
39 capable of creating a screen image that includes the digitally transmitted Internet content

1 having a PIP image of an analog transmitted television show. Such a video processing  
2 device is available from Oxford Micro Devices or Oxford Connecticut  
3 ([www.omdi.com](http://www.omdi.com)). Display driving means receives the composed video signal and  
4 outputs a display driving signal. A display, such as an LCD, receives the display  
5 driving signal and displays the screen image. Thus, in accordance with the present  
6 invention, a wireless display terminal is provided that allows a user to access the  
7 Internet while viewing a television program.

8 As the Internet becomes the source of computer applications, such as word  
9 processing, appointment books, etc., the inventive wireless display device will provide  
10 an inexpensive solution for performing most of the activities that are now done using a  
11 conventional desktop computer. In this case, the inventive wireless display device may  
12 include a local storage device, such as a hard drive, to keep documents and other files  
13 locally available.

14 Figure 73(b) is a block diagram illustrating an antenna node device 200 for  
15 conditioning a wireless signal for communication over a pre-existing hard wire network  
16 The antenna node device 200 includes an antenna for receiving a  
17 wireless signal. First conditioning means conditions the wireless signal  
18 into a wired medium transmission signal for effective transmission over  
19 a wired network. Connecting means connects the conditioning means to  
20 the wired network, whereby the received wireless signal is converted  
21 into the wired medium transmission signal and injected onto the wired  
22 network. The antenna node device 200 also includes means for  
23 receiving a wired medium transmission signal from a wired network,  
24 which may be a connection to an in-home cable network, or an inter-  
25 office Ethernet network. Second conditioning means conditions the  
26 received wired medium transmission signal into a wireless signal  
27 effective for wireless transmission. Emitting means, such as a  
28 directional antenna, emits the wireless signal, whereby the received  
29 wired medium transmission signal is converted into the wireless signal  
30 and emitted for reception by a remote wireless device. The first  
31 conditioning means includes an down-converter and the second  
32 conditioning means comprises a up-converter. The up-converter is  
33 effective for converting a received 900 MHz band signal to a 2.4 Ghz  
34 band signal, and the down-converter is effective for converting a  
35 received 2.4 Ghz band signal to a 900 Mhz band signal. Thus, for  
36 example, 2.4 Ghz wireless networking devices can use a pre-existing  
37 home cable network as a bridge for spanning long distances between  
38 wireless devices. The up-converting and down-converting of the signal

1 enables it to be effectively transmitted through existing devices on the  
2 wire network, such as splitters and amplifiers.  
3  
4 Figure 73(c) illustrates the use of the inventive antenna node devices 200 in an office  
5 environment. In this case, the antenna node devices 200 provide an effective bridge  
6 between segments of a wired Ethernet (or other type) network, allowing for expansion  
7 of the in-office Ethernet network without requiring new difficult-to-install wires  
8 between the segments. Further, mobile devices, such as the inventive wireless display  
9 terminal, can be effectively brought into the office and connected with devices that are  
10 both wireless and hard wired connected to the Ethernet network.

**Claims:**

- 1.) A method for indicating the content recorded on a video tape, characterized by the steps of: determining content-indicating information corresponding to the content recorded on or to be recorded on a video tape; converting the determined content-indicating information into a recordable content signal; generating a recordable information signal for recording on the video tape including the recordable content signal corresponding to the content-indicating information; transferring the recordable information signal to a recording head of a video tape recorder; and controlling the video tape recorder to record the recordable information.
- 2.) A method of indicating the content recorded on a video tape according to claim 1; further comprising determining control cue information for use in automatically controlling a video tape recorder; and wherein the step of generating the recordable information signal includes generating the recordable information signal including a recordable control cue signal corresponding to the control cue information.
- 3.) A method of indicating the content recorded on a video tape according to claim 2; wherein the content-indicating information comprises HTML data.
- 4.) A method of indicating the content recorded on a video tape, characterized by the steps of: controlling a video recorder to playback a recordable information signal including a recordable content signal previously recorded on a video tape; transferring the recordable information signal to an information signal detector; and detecting content-indicating information from the recordable content signal so that a representation of the content of television programs recorded on the video tape can be displayed.
- 5.) A method of indicating the content recorded on a video tape according to claim 4; wherein the recordable information signal includes a recordable control cue signal; and further comprising the step of detecting control cue information for controlling the video tape recorder; and automatically controlling the video tape recorder depending on the control cue information.
- 6.) A method of indicating the content recorded on a video tape according to claim 5; wherein the content-indicating information comprises HTML data.
- 7.) A video recording system for recording content-indicating information on a video tape, characterized by: content determining means for determining content-indicating

1 information corresponding to the content recorded on or to be recorded on a video tape;  
2 converting means for converting the determined content-indicating information into  
3 recordable content data; generating means for generating a recordable information signal  
4 for recording on the video tape including content signal generating means for generating  
5 a recordable content signal corresponding to the recordable content data; transferring  
6 means for transferring the recordable information signal to a video tape recorder; and  
7 video device controlling means for controlling the video tape recorder to record the  
8 recordable information.

9  
10 8.) A video recording system for recording content-indicating information on a video  
11 tape according to claim 7; further comprising cue determining means for determining  
12 control cue information for automatically controlling a video tape recorder; wherein the  
13 generating means includes means for generating the recordable information signal  
14 including cue signal generating means for generating a recordable control cue signal  
15 corresponding to the control cue information, and combining means for combining the  
16 recordable content signal with the recordable cue signal to generate the recordable  
17 information signal.

18  
19 9.) A video recording system for recording content-indicating information on a video  
20 tape according to claim 8; where the video device controlling means includes playback  
21 controlling means for controlling the video recorder to playback the recordable  
22 information signal including the recordable content signal previously recorded on the  
23 video tape; detecting means for detecting the content-indicating information from the  
24 recordable information signal so that an indication of the recorded content of the video  
25 tape can be displayed; and wherein the transferring means includes means for  
26 transferring the recordable information signal to an information signal detecting means.

27  
28 10.) A video recording system for recording content-indicating information on a video  
29 tape according to claim 9; wherein the detecting means includes means for detecting  
30 control cue information from the recordable information signal; and further comprising  
31 device control signal emitting means for emitting device control signals for  
32 automatically controlling the video tape recorder depending on the control cue  
33 information under the control of the computer.

34  
35 11.) A video recording system for recording content-indicating information on a video  
36 tape according to claim 10; wherein the content-indicating information comprising  
37 HTML data.

38

1 12.) A home multimedia network, characterized by: a computer node including  
2 computer display local channel generating means for generating a computer display  
3 local television channel containing a video output signal corresponding to a computer  
4 display output signal generated by a computer locatable at the computer node, the  
5 computer display local television channel being effective for allowing displaying of  
6 video data generated by the computer on a television located on the home multimedia  
7 network remotely from the computer, the computer node also including device control  
8 signal generating means controllable by the computer for generating device control  
9 signals transferable over the home multimedia network and effective to selectively  
10 control at least one video device located on the home multimedia network remotely from  
11 the computer, the computer node further including computer control signal receiving  
12 means for receiving computer control signals transferred over the home multimedia  
13 network; and a video device node including device control signal emitting means for  
14 receiving the device control signals and for emitting video device control signals  
15 effective for controlling a video device located on the home multimedia network  
16 remotely from the computer so that the video device can be remotely controlled by the  
17 computer, the video device node further include computer control signal generating  
18 means controllable by a user input device for generating computer control signals  
19 transferable over the home multimedia network so that the computer can be remotely  
20 controlled in response to a user input.

21  
22 13.) A home multimedia network according to claim 12; further comprising video  
23 device local channel generating means for generating a video device local television  
24 channel containing a video output signal of the at least one video device located at the at  
25 least one video device node on the home multimedia network.

26  
27 14.) A home multimedia network according to claim 12; further comprising at least one  
28 microphone input located at a location on the home multimedia network for receiving  
29 microphone signals; selecting means for selecting the input of the microphone signals;  
30 and adding means for adding the selected input of the microphone signals to the home  
31 multimedia network.

32  
33 15.) A home multimedia network according to claim 14; further comprising means for  
34 generating audible sound signals corresponding to the selected input of the microphone  
35 signals at a location on the home multimedia network remote from the location of the at  
36 least one microphone input receiving the selected input of the microphone signals.

37  
38 16.) A home multimedia network according to claim 15; further comprising at least one  
39 video camera input located at a location on the home multimedia network for receiving



- 1 video camera signals; selecting means for selecting the input of the video camera  
2 signals; and wherein at least one of the computer display local television channel  
3 generating means and the video device local television channel generating means  
4 includes means for including the selected input of the microphone signals and the  
5 selected input of the video camera signals in the corresponding computer display local  
6 television channel and the video device local television channel.  
7
- 8 17.) A home multimedia network according to claim 16; further comprising means for  
9 connecting the selected input of the microphone signals to a telephone system.  
10
- 11 18.) A home multimedia network according to claim 17; further comprising means for  
12 notifying the existence of a received telephone call on at least one display connected to  
13 the home multimedia system and means for answering the received telephone call and  
14 selecting the input of the microphone signals received by the microphone input.  
15
- 16 19.) A home multimedia network according to claim 18; further comprising means for  
17 determining a telephone number of a received telephone call; and means for displaying  
18 the determined telephone number on said at least one display.  
19
- 20 20.) A home multimedia network according to claim 13; further comprising means for  
21 connecting to the Internet and downloading Internet data; Internet video output signal  
22 generating means for receiving the Internet data and generating an Internet video signal  
23 dependent thereon; and wherein the device local channel generating means includes  
24 means for generating the video device local television signal containing the Internet  
25 video output signal data.  
26
- 27 21.) A home multimedia network according to claim 12; further comprising means for  
28 connecting the computer to the Internet and downloading Internet data; and wherein the  
29 computer display local channel generating means includes means for generating the  
30 computer display local television signal containing the Internet video output signal data.  
31
- 32 22.) A home multimedia network, characterized by: a first computer node including  
33 computer display local channel generating means for generating a computer display  
34 local television channel containing a video output signal corresponding to a computer  
35 display output signal generated by a computer locatable at the computer node, the  
36 computer display local television channel being effective for allowing displaying of  
37 video data generated by the computer on an ordinary television located on the home  
38 multimedia network remotely from the computer, device control signal generating  
39 means controllable by the computer for generating device control signals transferable

1 over the home multimedia network and effective to selectively control at least one video  
2 device located on the home multimedia network remotely from the computer, computer  
3 control signal receiving means for receiving computer control signals transferred over  
4 the home multimedia network, content determining means for determining content-  
5 indicating information corresponding to the content recorded on or to be recorded on a  
6 video tape, cue determining means for determining control cue information for  
7 automatically controlling a video tape recorder, converting means for converting the  
8 determined content-indicating information into recordable content data, generating  
9 means for generating a recordable information signal for recording on the video tape,  
10 the generating means including content signal generating means for generating a  
11 recordable content signal corresponding to the recordable content data, cue signal  
12 generating means for generating a recordable control cue signal corresponding to the  
13 control cue information and combining means for combining the recordable content  
14 signal with the recordable cue signal to generate the recordable information signal,  
15 transferring means for transferring the recordable information signal to a video tape  
16 recorder, and video device controlling means for controlling the video tape recorder to  
17 record the recordable information.

18  
19 23.) A home multimedia network according to claim 22; where the video device  
20 controlling means includes playback controlling means for controlling the video  
21 recorder to playback a recorded information signal including the recordable content  
22 signal previously recorded on the video tape; detecting means for detecting the content-  
23 indicating information from the recordable information signal so that an indication of the  
24 recorded content of the video tape can be displayed; and wherein the transferring means  
25 includes means for transferring the recordable information signal to an information  
26 signal detecting means.

27  
28 24.) A home multimedia network according to claim 23; comprising a video device  
29 node including video device local channel generating means for generating a video  
30 device local television channel containing a video and audio output of the video recorder  
31 located at the at least one video device node on the home multimedia network, wherein  
32 the recorded information signal played back from the video tape is included in the video  
33 and audio output of the video recorder; device control signal emitting means for  
34 receiving the device control signals and for emitting video device control signals  
35 effective for controlling the video recorder located on the home multimedia network  
36 remotely from the computer so that the video device can be remotely controlled by the  
37 computer, the video device node further including computer control signal generating  
38 means controllable by a user input device for generating computer control signals

- 1 transferable over the home multimedia network so that the computer can be remotely  
2 controlled in response to a user input.  
3
- 4 25.) A home multimedia network according to claim 24; wherein the detecting means  
5 includes means for detecting control cue information from the recordable information  
6 signal; and further comprising device control signal emitting means for emitting device  
7 control signals for automatically controlling the video tape recorder depending on the  
8 control cue information.  
9
- 10 26.) A home multimedia network according to claim 24; wherein the video device local  
11 channel generating means includes means for generating the video device local  
12 television channel as at least one of dc signals, rf signals carryable over a conductive  
13 wire, light spectrum signals carryable over a fiber optic, wireless rf signals and wireless  
14 ir signals; and the computer control signal generating means includes means for  
15 generating the computer control signals as at least one of dc signals, rf signals carryable  
16 over a conductive wire, light spectrum signals carryable over a fiber optic, wireless rf  
17 signals and wireless ir signals.  
18
- 19 27.) A home multimedia network according to claim 24; wherein the video device local  
20 channel generating means includes means for generating the video device local  
21 television channel as rf signals carryable over a pre-existing home coaxial cable  
22 television network; and the computer control signal generating means includes means  
23 for generating the computer control signals as dc signals carryable over the pre-existing  
24 home coaxial cable television network.  
25
- 26 28.) A home multimedia network according to claim 22; wherein the computer display  
27 local channel generating means includes high-definition signal generating means for  
28 generating the local television channel as containing the video output signal as high-  
29 definition-display-device-driving information for driving a high definition display such  
30 as a computer monitor or high definition television; and further comprising a high-  
31 definition node having display-driving means for receiving the local television channel  
32 containing the high-definition-display-device-driving information and for driving a high  
33 definition display device.  
34
- 35 29.) A home multimedia network according to claim 22; wherein the first computer  
36 node includes computer data signal generating means for generating a computer data  
37 signal in accordance with computer data received from the computer for transfer of the  
38 computer data signal over the home multimedia network; and further comprising a  
39 computer device node having computer data signal receiving means for receiving the

1 computer data signal from the home multimedia network for transfer to a second  
2 computer or computer data using device such as a printer or data storage device  
3 locatable at the second computer node.

4  
5 30.) A home multimedia network according to claim 28; wherein the computer data  
6 signal generating means includes means for generating the computer data signal as at  
7 least one of dc signals, rf signals carryable over a conductive wire, light spectrum  
8 signals carryable over a fiber optic, wireless rf signals and wireless ir signals.

9  
10 31.) A home multimedia network according to claim 22; further comprising a second  
11 computer node having another computer display local channel generating means for  
12 generating another computer display local television channel containing a video output  
13 signal corresponding to a computer display output signal generated by a second  
14 computer, and another computer control signal receiving means for receiving the  
15 computer control signals transferred over the home multimedia network.

16  
17 32.) A home multimedia network according to claim 31; wherein the other computer  
18 display local channel generating means includes means for generating the other local  
19 computer display local television channel as at least one of dc signals, rf signals  
20 carryable over a conductive wire, light spectrum signals carryable over a fiber optic,  
21 wireless rf signals and wireless ir signals.

22  
23 33.) A home multimedia network according to claim 31; wherein the other computer  
24 display local channel generating means includes means for generating the other local  
25 computer display local television channel as rf signals carryable over a pre-existing  
26 home coaxial cable television network; and the other computer control signal receiving  
27 means includes means for receiving the computer control signals as dc signals carryable  
28 over the pre-existing home coaxial cable television network.

29  
30 34.) A home multimedia network according to claim 22; further comprising  
31 addressable controlling means including an address signal generator for generating an  
32 address signal and address signal receiver for receiving the address signal, the address  
33 signal generator being controllable by the computer and the address signal receiver  
34 being effective for controlling the device control signal emitting means to emit the  
35 device control signal depending on the received address signal.

36  
37 35.) A home multimedia network according to claim 34; wherein the address signal  
38 generating includes means for generating the address signal as a signal carryable over a  
39 pre-existing home coaxial cable television network and connecting means for

1 connecting the address signal generator to the pre-existing home coaxial cable television  
2 network.

3  
4 36.) A home multimedia network according to claim 22; further comprising a selectable  
5 channel filtering means for selectably filtering channel frequencies carried on a  
6 television signal source in communication with the home multimedia network, the  
7 selectably filtered channel frequencies being available for use as local television  
8 channels.

9  
10 37.) A home multimedia network according to claim 22; wherein the computer display  
11 local channel generating means includes means for generating the computer display  
12 local television channel as at least one of dc signals, rf signals carryable over a  
13 conductive wire, light spectrum signals carryable over a fiber optic, wireless rf signals  
14 and wireless ir signals; the transferring means includes means for transferring the  
15 information signal as at least one of dc signals, rf signals carryable over a conductive  
16 wire, light spectrum signals carryable over a fiber optic, wireless rf signals and wireless  
17 ir signals; and the device control signal generating means includes means for generating  
18 the device control signals as at least one of dc signals, rf signals carryable over a  
19 conductive wire, light spectrum signals carryable over a fiber optic, wireless rf signals  
20 and wireless ir signals.

21  
22 38.) A home multimedia network according to claim 22; wherein the computer display  
23 local channel generating means includes means for generating the computer display  
24 local television channel as rf signals carryable over a pre-existing home coaxial cable  
25 television network; the transferring means includes means for transferring the  
26 information signal as rf signals over the pre-existing home coaxial cable television  
27 network; and the device control signal generating means includes means for generating  
28 the device control signals as rf signals carryable over the pre-existing home coaxial  
29 cable television network.

30  
31 39.) A home multimedia network according to claim 22; further comprising at least one  
32 microphone input located at a location on the home multimedia network for receiving  
33 microphone signals; selecting means for selecting the input of the microphone signals;  
34 and adding means for adding the selected input of the microphone signals to the home  
35 multimedia network.

36  
37 40.) A home multimedia network according to claim 39; further comprising means for  
38 generating audible sound signals corresponding to the selected input of the microphone

- 1 signals at a location on the home multimedia network remote from the location of the at  
2 least one microphone input receiving the selected input of the microphone signals.  
3
- 4 41.) A home multimedia network according to claim 40; further comprising at least one  
5 video camera input located at a location on the home multimedia network for receiving  
6 video camera signals; selecting means for selecting the input of the video camera  
7 signals; and wherein at least one of the computer display local television channel  
8 generating means and the video device local television channel generating means  
9 includes means for including the selected input of the microphone signals and the  
10 selected input of the video camera signals in the corresponding computer display local  
11 television channel and the video device local television channel.  
12
- 13 42.) A home multimedia network according to claim 41; further comprising means for  
14 connecting the selected input of the microphone signals to a telephone system.  
15
- 16 43.) A home multimedia network according to claim 42; further comprising means for  
17 notifying the existence of a received telephone call on at least one display connected to  
18 the home multimedia system and means for answering the received telephone call and  
19 selecting the input of the microphone signals received by the microphone input.  
20
- 21 44.) A home multimedia network according to claim 43; further comprising means for  
22 determining a telephone number of a received telephone call; and means for displaying  
23 the determined telephone number on said at least one display.  
24
- 25 45.) A home multimedia network according to claim 23; further comprising means for  
26 connecting to the Internet and downloading Internet data; Internet video output signal  
27 generating means for receiving the Internet data and generating an Internet video signal  
28 dependent thereon; and wherein the device local channel generating means includes  
29 means for generating the video device local television signal containing the Internet  
30 video output signal data.  
31
- 32 46.) A home multimedia network according to claim 24; further comprising means for  
33 connecting the computer to the Internet and downloading Internet data; and wherein the  
34 computer display local channel generating means includes means for generating the  
35 computer display local television signal containing the Internet video output signal data.  
36
- 37 47.) An analog scrambler, characterized by: handshake transmitting means for  
38 transmitting a handshake signal from a mobile terminal to a central computer; receiving  
39 means for receiving the handshake signal; handshake value and frequency adjustment

- 1 function transmitting means for transmitting a handshake value and frequency  
2 adjustment function to the mobile terminal from the central computer; determining  
3 means for determining if a received handshake value is correct; transmitting frequency  
4 adjusting means for adjusting the transmitting frequency of a wireless signal according  
5 to the frequency adjustment function; and receiving frequency adjusting means for  
6 adjusting the receiving frequency of a wireless signal according to the frequency  
7 adjustment function.
- 8 48.) An analog scrambler according to claim 47; further comprising password  
9 protection means for receiving a predetermined password for determining at least one of  
10 user preferences and network access.
- 11 49.) An antenna system for use in wireless network, characterized by: signal  
12 transducing means including an antenna member for transducing a signal carried over a  
13 wired network to a signal transmitted wirelessly; connecting means for connecting the  
14 signal transducing means to the wired network.
- 15 50.) An antenna system according to claim 49; wherein the antenna member comprising  
16 a directional antenna.
- 17 51.) An antenna system according to claim 50; wherein the wired network comprises a  
18 coax cable network.
- 19 52.) A method of controlling a video recorder through control signals generated by a  
20 remote computer for indicating the content recorded on a video tape, characterized by  
21 the steps of: determining content-indicating information corresponding to content to be  
22 recorded on a video tape; storing the determined content-indicating information in a tape  
23 database; determining a tape identification value for the video tape; storing the tape  
24 identification value in the tape database; generating a recordable identification signal for  
25 recording on the video tape corresponding to the tape identification value; transferring  
26 the tape identification signal to a recording head of a video tape recorder; and controlling  
27 the video tape recorder to record the tape identification signal.
- 28
- 29 53.) A method of controlling a video recorder through control signals generated by a  
30 remote computer for indicating the content recorded on a video tape according to claim  
31 52; wherein the tape identification signal is recorded substantially continuously during  
32 the recording of the content signal on the video tape.
- 33
- 34 54.) A method of controlling a video recorder through control signals generated by a  
35 remote computer for indicating the content recorded on a video tape according to claim  
36 53; wherein the tape identification signal is recorded non-continuously during the  
37 recording of the content signal on the video tape.
- 38

- 1 55.) A method of controlling a video recorder through control signals generated by a  
2 remote computer for indicating the content recorded on a video tape according to claim  
3 52; further comprising the steps of receiving a content signal containing content to be  
4 recorded on the video tape; mixing the content signal with the tape content and tape  
5 identification; transferring the tape content and tape identification mixed signal to the  
6 recording head of the video tape recorder; and controlling the video tape recorder to  
7 record the content and tape identification mixed signal.  
8
- 9 56.) A method of controlling a video recorder through control signals generated by a  
10 remote computer for indicating the content recorded on a video tape according to claim  
11 55; wherein the content signal comprising a television signal containing a television  
12 program.  
13
- 14 57.) A method of controlling a video recorder through control signals generated by a  
15 remote computer for indicating the content recorded on a video tape according to claim  
16 52; further comprising determining control cue information for use in automatically  
17 controlling the video tape recorder; a recordable control cue signal corresponding to the  
18 control cue information; and mixing the control cue signal with the content and tape  
19 identification mixed signal; transferring the mixed control cue, content and tape  
20 identification mixed signal to the recording head of the video tape recorder; and  
21 controlling the video tape recorder to record the control cue, content and tape  
22 identification mixed signal.  
23
- 24 58.) A method of controlling a video recorder through control signals generated by a  
25 remote computer for indicating the content recorded on a video tape according to claim  
26 57; wherein at least one of the recordable control cue signal and the tape identification  
27 signal comprises a signal recordable on the video tape that is not displayed during the  
28 normal playback of the tape.  
29
- 30 59.) A method of controlling a video recorder through control signals generated by a  
31 remote computer for indicating the content recorded on a video tape according to claim  
32 57; wherein at least one of the recordable control cue signal and the tape identification  
33 signal comprises an inaudible tone signal.  
34
- 35 60.) A method of controlling a video recorder through control signals generated by a  
36 remote computer for indicating the content recorded on a video tape according to claim  
37 52; wherein the content-indicating information comprises HTML data.  
38



- 1 61.) A method of controlling a video recorder through control signals generated by a  
2 remote computer in accordance with control cues stored in a tape database, characterized  
3 by the steps of: determining control cues corresponding to the generation of control  
4 signals under the control of a computer for control a remotely located video recorder;  
5 storing the determined control cues in a tape database; determining a tape identification  
6 value for the video tape; storing the tape identification value in the tape database;  
7 generating a recordable identification signal for recording on the video tape  
8 corresponding to the tape identification value; transferring the tape identification signal  
9 to a recording head of a video tape recorder; and controlling the video tape recorder to  
10 record the tape identification signal.
- 11
- 12 62.) A method of controlling a video recorder through control signals generated by a  
13 remote computer in accordance with control cues stored in a tape database according to  
14 claim 61; wherein the tape identification signal is recorded substantially continuously  
15 during the recording of the content signal on the video tape.
- 16
- 17 63.) A method of controlling a video recorder through control signals generated by a  
18 remote computer in accordance with control cues stored in a tape database according to  
19 claim 61; wherein the tape identification signal is recorded non-continuously during the  
20 recording of the content signal on the video tape.
- 21
- 22 64.) A method of controlling a video recorder through control signals generated by a  
23 remote computer in accordance with control cues stored in a tape database according to  
24 claim 61; further comprising the steps of receiving a content signal containing content to  
25 be recorded on the video tape; mixing the content signal with the tape content and tape  
26 identification; transferring the tape content and tape identification mixed signal to the  
27 recording head of the video tape recorder; and controlling the video tape recorder to  
28 record the content and tape identification mixed signal.
- 29
- 30 65.) A method of controlling a video recorder through control signals generated by a  
31 remote computer in accordance with control cues stored in a tape database according to  
32 claim 64; wherein the content signal comprising a television signal containing a  
33 television program.
- 34
- 35 66.) A method of controlling a video recorder through control signals generated by a  
36 remote computer in accordance with control cues stored in a tape database according to  
37 claim 61; further comprising the step of determining a generation time for generating a  
38 control signal corresponding with the control cue information for use in automatically  
39 controlling the video tape recorder.

- 1  
2 67.) A method of controlling a video recorder through control signals generated by a  
3 remote computer in accordance with control cues stored in a tape database according to  
4 claim 66; wherein the generation time is determined by generating a tone signal during  
5 the recording of the video tape, the tone signal being an indication of the generation time  
6 for generating the control signal corresponding with the control cue information.  
7  
8 68.) A method of controlling a video recorder through control signals generated by a  
9 remote computer in accordance with control cues stored in a tape database according to  
10 claim 67; wherein the generation time is determined as a time value occurring after a  
11 detection of the tone signal during the playback of the video tape.  
12  
13 69.) A method of controlling a video recorder through control signals generated by a  
14 remote computer in accordance with control cues stored in a tape database according to  
15 claim 68; wherein the time value corresponding to the generation time is stored in the  
16 tape database.  
17  
18 70.) A method of controlling a video recorder through control signals generated by a  
19 remote computer for indicating the content recorded on a video tape, characterized by  
20 the steps of: generating control signals using a computer for controlling a video recorder  
21 to playback a recordable identification signal previously recorded on a video tape;  
22 transferring the recordable identification signal to the computer; and determining a tape  
23 identification value for the video tape; comparing the tape identification value with data  
24 stored in a tape database; and determining content-indicating information stored in the  
25 tape data base corresponding to the tape identification value so that a representation of  
26 the content of television programs recorded on the video tape can be displayed.  
27  
28 71.) A method of controlling a video recorder through control signals generated by a  
29 remote computer for indicating the content recorded on a video tape according to claim  
30 70; wherein the recordable information signal includes a recordable control cue signal;  
31 and further comprising the step of detecting control cue information for controlling the  
32 video tape recorder; and automatically controlling the video tape recorder depending on  
33 the control cue information.  
34  
35 72.) A method of indicating the content recorded on a video tape according to claim 71;  
36 wherein the content-indicating information comprises HTML data.  
37  
38 73.) A video recording system for recording content-indicating information on a video  
39 tape, comprising: content determining means for determining content-indicating

1 information corresponding to the content recorded on or to be recorded on a video tape;  
2 converting means for converting the determined content-indicating information into  
3 recordable content data; generating means for generating a recordable information signal  
4 for recording on the video tape including content signal generating means for generating  
5 a recordable content signal corresponding to the recordable content data; transferring  
6 means for transferring the recordable information signal to a video tape recorder; and  
7 video device controlling means for controlling the video tape recorder to record the  
8 recordable information.

9  
10 74.) A video recording system for recording content-indicating information on a video  
11 tape according to claim 73; further comprising cue determining means for determining  
12 control cue information for automatically controlling a video tape recorder; wherein the  
13 generating means includes means for generating the recordable information signal  
14 including cue signal generating means for generating a recordable control cue signal  
15 corresponding to the control cue information, and combining means for combining the  
16 recordable content signal with the recordable cue signal to generate the recordable  
17 information signal.

18  
19 75.) A video recording system for recording content-indicating information on a video  
20 tape according to claim 74; where the video device controlling means includes playback  
21 controlling means for controlling the video recorder to playback the recordable  
22 information signal including the recordable content signal previously recorded on the  
23 video tape; detecting means for detecting the content-indicating information from the  
24 recordable information signal so that an indication of the recorded content of the video  
25 tape can be displayed; and wherein the transferring means includes means for  
26 transferring the recordable information signal to an information signal detecting means.

27  
28 76.) A video recording system for recording content-indicating information on a video  
29 tape according to claim 75; wherein the detecting means includes means for detecting  
30 control cue information from the recordable information signal; and further comprising  
31 device control signal emitting means for emitting device control signals for  
32 automatically controlling the video tape recorder depending on the control cue  
33 information under the control of the computer.

34  
35 77.) A video recording system for recording content-indicating information on a video  
36 tape according to claim 76; wherein the content-indicating information comprising  
37 HTML data.

38

1 78.) A method of recording a television program with commercial break information  
2 using a video recorder characterized by the steps of; determining a television channel,  
3 date, time and duration for a selected television program; tuning in the determined  
4 television channel at the determined date and time to receive the selected television  
5 program by a computer controlled TV tuner; generating a local television channel  
6 characterized by computer generated video and audio output containing the selected  
7 television program; generating a control signal to tune a remotely located video recorder  
8 to the local television channel; computer monitoring the selected television program for  
9 the occurrence of a commercial break; detecting the start of a commercial break;  
10 generating a start-break signal indicating the start of the commercial break; mixing the  
11 start-break signal with the video and audio output containing the selected television  
12 program; and generating a control signal to control the video recorder to record local  
13 television channel containing the selected television program and the start-break signal.  
14

15 79.) A method of using a computer to control a video recorder for recording a  
16 television program with commercial break information characterized by the steps of:  
17 receiving at least the audio portion of a selected television program by a computer;  
18 monitoring the received portion of the selected television program to determine the start  
19 of a commercial break; recording the selected television program on a video tape;  
20 memorializing the location on the video tape of the start of the commercial break;  
21 monitoring the selected television program to determine the end of a commercial break;  
22 and memorializing the location of the end of the commercial break.  
23

24 80.) A method of using a computer to control a video recorder according to claim 79;  
25 further comprising using the computer to generate control signals to control the video  
26 recorder to record the selected television program.  
27

28 81.) A method of using a computer to control a video recorder according to claim 79;  
29 wherein the step of memorializing the locations on the video tape of the start and end of  
30 the commercial break comprises the steps of determining an elapsed time from the start  
31 of the selected television program to the start of the commercial break; and storing the  
32 elapsed time in a tape database stored in a storage device controlled by the computer.  
33

34 82.) A method of using a computer to control a video recorder according to claim 81;  
35 further comprising the steps of determining a tape identification value for the video tape;  
36 storing the tape identification value in the tape database; generating a recordable  
37 identification signal for recording on the video tape corresponding to the tape  
38 identification value; transferring the tape identification signal to a recording head of a

1 video tape recorder; and controlling the video tape recorder to record the tape  
2 identification signal.

3

4 83.) A method of using a computer to control a video recorder according to claim 81;  
5 wherein the step of memorializing the locations on the video tape of the start and end of  
6 the commercial break comprises the steps of determining an elapsed time from the start  
7 of the selected television program to the start of the commercial break; generating a data  
8 signal containing data indicating the determined elapsed time; and generating control  
9 signal to control the video recorder to record the data signal on the video tape.

10

11 84.) A method of using a computer to control a video recorder according to claim 81;  
12 further comprising the steps of determining a tape identification value for the video tape;  
13 storing the tape identification value in the tape database; generating a recordable  
14 identification signal for recording on the video tape corresponding to the tape  
15 identification value; transferring the tape identification signal to a recording head of a  
16 video tape recorder; and controlling the video tape recorder to record the tape  
17 identification signal.

18

19 85.) A home multimedia network, characterized by: a computer node including  
20 computer display local channel generating means for generating a computer display  
21 local television channel containing a video output signal corresponding to a computer  
22 display output signal generated by a computer locatable at the computer node, the  
23 computer display local television channel being comprised of a local carrier frequency  
24 that is outside the frequency range allotted to cable television channels, the computer  
25 display local channel being effective for allowing displaying of video data generated by  
26 the computer on a television located on the home multimedia network remotely from the  
27 computer after the video output signal is demodulated from the local carrier frequency,  
28 the computer node also including device control signal generating means controllable by  
29 the computer for generating device control signals transferable over the home  
30 multimedia network and effective to selectively control at least one video device located  
31 on the home multimedia network remotely from the computer, the computer node  
32 further including computer control signal receiving means for receiving computer  
33 control signals transferred over the home multimedia network; and a video device node  
34 including device control signal emitting means for receiving the device control signals  
35 and for emitting video device control signals effective for controlling a video device  
36 located on the home multimedia network remotely from the computer so that the video  
37 device can be remotely controlled by the computer, the video device node further  
38 include computer control signal generating means controllable by a user input device for

- 1 generating computer control signals transferable over the home multimedia network so  
2 that the computer can be remotely controlled in response to a user input.  
3
- 4 86.) A home multimedia network according to claim 85; wherein the video device node  
5 further comprises node modulation means for converting the computer display local  
6 channel to a television frequency of channel 3 or channel 4.  
7
- 8 87.) A home multimedia network according to claim 85; further comprising video  
9 device local channel generating means for generating a video device local television  
10 channel containing a video output signal of the at least one video device located at the at  
11 least one video device node on the home multimedia network, the video device local  
12 television channel being comprised of a local carrier frequency that is outside the  
13 frequency range allotted to cable television channels.  
14
- 15 88.) A home multimedia network according to claim 85; wherein the computer node  
16 further comprises node modulation means for converting the video device local channel  
17 to a television frequency of channel 3 or channel 4.  
18
- 19 89.) A home multimedia network according to claim 85; further comprising at least one  
20 microphone input located at a location on the home multimedia network for receiving  
21 microphone signals; selecting means for selecting the input of the microphone signals;  
22 and adding means for adding the selected input of the microphone signals to the home  
23 multimedia network.  
24
- 25 90.) A home multimedia network according to claim 89; further comprising means for  
26 generating audible sound signals corresponding to the selected input of the microphone  
27 signals at a location on the home multimedia network remote from the location of the at  
28 least one microphone input receiving the selected input of the microphone signals.  
29
- 30 91.) A home multimedia network according to claim 90; further comprising at least one  
31 video camera input located at a location on the home multimedia network for receiving  
32 video camera signals; selecting means for selecting the input of the video camera  
33 signals; and wherein at least one of the computer display local television channel  
34 generating means and the video device local television channel generating means  
35 includes means for including the selected input of the microphone signals and the  
36 selected input of the video camera signals in the corresponding computer display local  
37 television channel and the video device local television channel.  
38

- 1 92.) A home multimedia network according to claim 91; further comprising means for  
2 connecting the selected input of the microphone signals to a telephone system.  
3
- 4 93.) A home multimedia network according to claim 92; further comprising means for  
5 notifying the existence of a received telephone call on at least one display connected to  
6 the home multimedia system and means for answering the received telephone call and  
7 selecting the input of the microphone signals received by the microphone input.  
8
- 9 94.) A home multimedia network according to claim 93; further comprising means for  
10 determining a telephone number of a received telephone call; and means for displaying  
11 the determined telephone number on said at least one display.  
12
- 13 95.) A home multimedia network according to claim 89; further comprising means for  
14 connecting to the Internet and downloading Internet data; Internet video output signal  
15 generating means for receiving the Internet data and generating an Internet video signal  
16 dependent thereon; and wherein the device local channel generating means includes  
17 means for generating the video device local television signal containing the Internet  
18 video output signal data.  
19
- 20 96.) A home multimedia network according to claim 85; further comprising means for  
21 connecting the computer to the Internet and downloading Internet data; and wherein the  
22 computer display local channel generating means includes means for generating the  
23 computer display local television signal containing the Internet video output signal data.  
24
- 25 97.) A home multimedia network, characterized by: a first computer node including  
26 computer display local channel generating means for generating a computer display  
27 local television channel containing a video output signal corresponding to a computer  
28 display output signal generated by a computer locatable at the computer node, the  
29 computer display local television channel being effective for allowing displaying of  
30 video data generated by the computer on an ordinary television located on the home  
31 multimedia network remotely from the computer, device control signal generating  
32 means controllable by the computer for generating device control signals transferable  
33 over the home multimedia network and effective to selectively control at least one video  
34 device located on the home multimedia network remotely from the computer, computer  
35 control signal receiving means for receiving computer control signals transferred over  
36 the home multimedia network, at least one of content determining means for  
37 determining content-indicating information corresponding to the content recorded on or  
38 to be recorded on a video tape and cue determining means for determining control cue  
39 information for automatically controlling a video tape recorder, tape identification

1 determining means for determining a tape identification value for a video tape; storing  
2 means for storing the tape identification value in a tape database; generating means for  
3 generating a recordable tape identification signal for recording on the video tape,  
4 transferring means for transferring the recordable tape identification signal to a video  
5 tape recorder, and video device controlling means for generating a computer-controlled  
6 control signal for controlling the video tape recorder to record the recordable  
7 identification signal.

8  
9 98.) A home multimedia network according to claim 97; where the video device  
10 controlling means includes playback controlling means for controlling the video  
11 recorder to playback a recorded tape identification signal previously recorded on the  
12 video tape; detecting means for detecting the tape identification signal so that  
13 identification of the video tape can be determined and matched with control cue and/or  
14 content-indicating data stored in the tape database.

15  
16 99.) A home multimedia network according to claim 97; further comprising manually  
17 switchable local channel generating means for manually selecting a carrier frequency for  
18 computer display local television channel.

19  
20 100.) A home multimedia network according to claim 97; further comprising a  
21 selectable channel filtering means for selectably filtering channel frequencies carried on  
22 a television signal source in communication with the home multimedia network, the  
23 selectably filtered channel frequencies being available for use as local television  
24 channels.

25  
26 101.) A home multimedia network according to claim 97; wherein the computer display  
27 local channel generating means includes means for generating the computer display  
28 local television channel as at least one of dc signals, rf signals carryable over a  
29 conductive wire, light spectrum signals carryable over a fiber optic, wireless rf signals  
30 and wireless IR signals; the transferring means includes means for transferring the  
31 information signal as at least one of dc signals, rf signals carryable over a conductive  
32 wire, light spectrum signals carryable over a fiber optic, wireless rf signals and wireless  
33 IR signals; and the device control signal generating means includes means for  
34 generating the device control signals as at least one of dc signals, rf signals carryable  
35 over a conductive wire, light spectrum signals carryable over a fiber optic, wireless rf  
36 signals and wireless IR signals.

37  
38 102.) A home multimedia network according to claim 97; wherein the computer display  
39 local channel generating means includes means for generating the computer display



1 local television channel as rf signals carryable over a pre-existing home electrical wiring  
2 network; the transferring means includes means for transferring the tape identification  
3 signal as rf signals over the pre-existing home electrical wiring network; and the device  
4 control signal generating means includes means for generating the device control signals  
5 as rf signals carryable over the pre-existing home electrical wiring network.

6

7 103.) A home multimedia network according to claim 97; further comprising at least  
8 one microphone input located at a location on the home multimedia network for  
9 receiving microphone signals; selecting means for selecting the input of the microphone  
10 signals; and adding means for adding the selected input of the microphone signals to the  
11 home multimedia network.

12

13 104.) A home multimedia network according to claim 103; further comprising means  
14 for generating audible sound signals corresponding to the selected input of the  
15 microphone signals at a location on the home multimedia network remote from the  
16 location of the at least one microphone input receiving the selected input of the  
17 microphone signals.

18

19 105.) A home multimedia network according to claim 104; further comprising at least  
20 one video camera input located at a location on the home multimedia network for  
21 receiving video camera signals; selecting means for selecting the input of the video  
22 camera signals; and wherein at least one of the computer display local television channel  
23 generating means and the video device local television channel generating means  
24 includes means for including the selected input of the microphone signals and the  
25 selected input of the video camera signals in the corresponding computer display local  
26 television channel and the video device local television channel.

27

28 106.) A home multimedia network according to claim 105; further comprising means  
29 for connecting the selected input of the microphone signals to a telephone system.

30

31 107.) A home multimedia network according to claim 105; further comprising means  
32 for notifying the existence of a received telephone call on at least one display connected  
33 to the home multimedia system and means for answering the received telephone call and  
34 selecting the input of the microphone signals received by the microphone input.

35

36 108.) A home multimedia network according to claim 107; further comprising means  
37 for determining a telephone number of a received telephone call; and means for  
38 displaying the determined telephone number on said at least one display.

39

- 1 109.) A home multimedia network according to claim 97; further comprising a video  
2 device local channel generating means for generating a local channel containing the  
3 output of a video device connected on the network.  
4
- 5 110.) A home multimedia network according to claim 97; further comprising means for  
6 connecting to the Internet and downloading Internet data; Internet video output signal  
7 generating means for receiving the Internet data and generating an Internet video signal  
8 dependent thereon; and wherein the device local channel generating means includes  
9 means for generating the video device local television signal containing the Internet  
10 video output signal data.  
11
- 12 111.) A home multimedia network according to claim 97; further comprising means for  
13 connecting the computer to the Internet and downloading Internet data; and wherein the  
14 computer display local channel generating means includes means for generating the  
15 computer display local television signal containing the Internet video output signal data.  
16
- 17 112.) A home multimedia network, characterized by: a computer node including  
18 computer display local channel generating means for generating a computer display  
19 local television channel containing a video output signal corresponding to a computer  
20 display output signal generated by a computer locatable at the computer node, the  
21 computer display local television channel being comprised of a local carrier frequency  
22 that is outside the frequency range allotted to cable television channels, the computer  
23 display local channel being effective for allowing displaying of video data generated by  
24 the computer on a television located on the home multimedia network remotely from the  
25 computer after the video output signal is demodulated from the local carrier frequency,  
26 the computer node also including manual channel selecting means for manually  
27 selecting the local carrier frequency for the computer display local television channel  
28 from a predetermined set of local carrier frequencies; the computer node also including  
29 device control signal generating means controllable by the computer for generating  
30 device control signals transferable over the home multimedia network and effective to  
31 selectively control at least one video device located on the home multimedia network  
32 remotely from the computer, the computer node further including computer control  
33 signal receiving means for receiving computer control signals transferred over the home  
34 multimedia network; and a video device node including device control signal emitting  
35 means for receiving the device control signals and for emitting video device control  
36 signals effective for controlling a video device located on the home multimedia network  
37 remotely from the computer so that the video device can be remotely controlled by the  
38 computer, the video device node further include computer control signal generating  
39 means controllable by a user input device for generating computer control signals

- 1 transferable over the home multimedia network so that the computer can be remotely  
2 controlled in response to a user input.  
3
- 4 113.) A home multimedia network according to claim 112; wherein the video device  
5 node further comprises node modulation means for converting the computer display  
6 local channel to a television frequency of channel 3 or channel 4.  
7
- 8 114.) A home multimedia network according to claim 112; wherein the video device  
9 node further comprises video device local channel generating means for generating a  
10 video device local television channel containing a video output signal of the at least one  
11 video device located at the at least one video device node on the home multimedia  
12 network, the video device local television channel being comprised of a local carrier  
13 frequency that is outside the frequency range allotted to cable television channels, the  
14 video device node also including manual channel selecting means for manually selecting  
15 the local carrier frequency for the video device local television channel from a  
16 predetermined set of local carrier frequencies.  
17
- 18 115.) A home multimedia network according to claim 112; further comprising an audio  
19 device local channel generating means for generating an audio device local audio  
20 channel containing an audio output signal of the at least one audio device located at the  
21 at least one video device node, the computer node or at an audio device node on the  
22 home multimedia network, the audio device local channel being comprised of either a  
23 local carrier frequency that is outside the frequency range allotted to cable television  
24 channels or a local carrier frequency that is tunable by a conventional radio device.  
25
- 26 116.) A home multimedia network according to claim 114; wherein the computer node  
27 further comprises node modulation means for converting the video device local channel  
28 to a television frequency of channel 3 or channel 4.  
29
- 30 117.) A home multimedia network according to claim 112; further comprising at least  
31 one microphone input located at a location on the home multimedia network for  
32 receiving microphone signals; selecting means for selecting the input of the microphone  
33 signals; and adding means for adding the selected input of the microphone signals to the  
34 home multimedia network.  
35
- 36 118.) A home multimedia network according to claim 117; further comprising means  
37 for generating audible sound signals corresponding to the selected input of the  
38 microphone signals at a location on the home multimedia network remote from the

- 1 location of the at least one microphone input receiving the selected input of the  
2 microphone signals.  
3
- 4 119.) A home multimedia network according to claim 118; further comprising at least  
5 one video camera input located at a location on the home multimedia network for  
6 receiving video camera signals; selecting means for selecting the input of the video  
7 camera signals; and wherein at least one of the computer display local television channel  
8 generating means and the video device local television channel generating means  
9 includes means for including the selected input of the microphone signals and the  
10 selected input of the video camera signals in the corresponding computer display local  
11 television channel and the video device local television channel.  
12
- 13 120.) A home multimedia network according to claim 119; further comprising means  
14 for connecting the selected input of the microphone signals to a telephone system.  
15
- 16 121.) A home multimedia network according to claim 120; further comprising means  
17 for notifying the existence of a received telephone call on at least one display connected  
18 to the home multimedia system and means for answering the received telephone call and  
19 selecting the input of the microphone signals received by the microphone input.  
20
- 21 122.) A home multimedia network according to claim 121; further comprising means  
22 for determining a telephone number of a received telephone call; and means for  
23 displaying the determined telephone number on said at least one display.  
24
- 25 123.) A home multimedia network according to claim 119; further comprising means  
26 for connecting to the Internet and downloading Internet data; Internet video output  
27 signal generating means for receiving the Internet data and generating an Internet video  
28 signal dependent thereon; and wherein the device local channel generating means  
29 includes means for generating the video device local television signal containing the  
30 Internet video output signal data.  
31
- 32 124.) A home multimedia network according to claim 117; further comprising means  
33 for connecting the computer to the Internet and downloading Internet data; and wherein  
34 the computer display local channel generating means includes means for generating the  
35 computer display local television signal containing the Internet video output signal data.  
36
- 37 125.) A wireless display terminal system for use with a multimedia network having a  
38 wireless transceiver node for receiving and transmitting control signals and video data to  
39 wireless devices; the display terminal device characterized by: a housing member; a

1 display screen held by the housing; computer control signal generating means for  
2 generating computer control signals for controlling a remotely located computer; a  
3 display driver for driving the display screen in response to a display signal generated by  
4 the remotely located computer; and a terminal side wireless transceiver disposed within  
5 the housing member for transmitting the computer control signals to the remotely  
6 located computer as a wireless signal and for receiving the display signal generated by  
7 the remotely located computer as a wireless signal.

8  
9 126.) A wireless display terminal system according to claim 125; wherein the signal  
10 generated by the remotely located computer comprises computer display video data; and  
11 further including graphic generating means for generating a graphical display receptive  
12 by the display driver for displaying graphical information in accordance with simple  
13 control signals transmitted by the computer.

14  
15 127.) A wireless display terminal system according to claim 125; further comprising a  
16 touch sensitive input device for receiving user input for controlling the generating of the  
17 computer control signals.

18  
19 128.) A wireless display terminal system according to claim 127; wherein the touch  
20 sensitive input device comprises at least one of a touch screen disposed adjacent to the  
21 display screen, a pressure sensitive keyboard, a track pad and a track ball.

22  
23 129.) A wireless display terminal system according to claim 125; wherein the terminal  
24 side wireless transceiver comprises at least one transmitter and one receiver selected  
25 comprised of an infrared transmitter, an infrared receiver, an ultrasonic transmitter,  
26 and ultrasonic receiver, a rf transmitter and an rf receiver.

27  
28 130.) A wireless display terminal system according to claim 125; further comprising a  
29 wireless transceiver node connected to a hard wired network having a connection to the  
30 remotely located computer, the wireless transceiver node including a computer control  
31 signal receiver for receiving the wireless signal including the computer control signals  
32 from the terminal side wireless transceiver and a display signal transmitter for  
33 transmitting the display signal generated by the remotely located computer to the  
34 terminal side wireless transceiver.

35  
36 131.) A wireless display terminal system according to claim 125; further comprising a  
37 video input device for generating at least one of a video signal and an audio signal; and  
38 wherein the terminal display side wireless transceiver includes means for transmitting

1 the at least one video signal and audio signal to the wireless transceiver node as a  
2 wireless signal .

3

4 132.) A wireless display terminal system according to claim 125; further comprising a  
5 wireless transceiver node connected to the computer, the wireless transceiver node  
6 including a computer control signal receiver for receiving the wireless signal including  
7 the computer control signals from the terminal side wireless transceiver and a display  
8 signal transmitter for transmitting the display signal generated by the remotely located  
9 computer to the terminal side wireless transceiver.

10

11 133.) A wireless display terminal system according to claim 125; further comprising a  
12 video input device for generating at least one of a video signal and an audio signal; and  
13 wherein the terminal display side wireless transceiver includes means for transmitting  
14 the at least one video signal and audio signal to the wireless transceiver node as a  
15 wireless signal .

16

17 134.) A wireless display terminal system according to claim 125;  
18 further comprising device remote control signal generating means  
19 for generating remote control signals effective for controlling  
20 appliances receptive of such control signals.

21

22 135.) A wireless display terminal system comprising: a housing  
23 member; a display screen held by the housing; control signal  
24 generating means for generating control signals for controlling at  
25 least one remotely located data source; a first wireless data signal  
26 receiving means for receiving a first wireless data signal; a second  
27 wireless signal receiving means for receiving a second wireless  
28 data signal; video processing means for processing video  
29 information contained in the first and the second wireless data  
30 signal, the video processing means being effective for outputting a  
31 composed video signal containing a screen image composed of a  
32 split screen or picture-in-a-picture display comprised of the video  
33 information; display driving means for receiving the composed

- 1 video signal and outputting a display driving signal; and a display  
2 for receiving the display driving signal and displaying the screen  
3 image.  
4
- 5 136.) A wireless display terminal according to claim 135; further comprising a touch  
6 sensitive input device for receiving user input for controlling the generating of the  
7 computer control signals.  
8
- 9 137.) A wireless display terminal system according to claim 135; further comprising a  
10 wireless transceiver node connected to a hard wired network in communication with a  
11 remotely located computer.  
12
- 13 138.) A wireless display terminal according to claim 135; further  
14 comprising a video input device for generating at least one of a  
15 video signal and an audio signal; and means for transmitting the at  
16 least one video signal and audio signal as a wireless signal.  
17
- 18 ~~138.~~<sup>139</sup>.) A wireless display terminal system according to claim 135;  
19 further comprising remote control signal generating means for  
20 generating remote control signals effective for controlling  
21 computers and appliances receptive of such control signals.  
22
- 23 140.) An antenna node device, characterized by: an antenna for receiving a wireless  
24 signal; first conditioning means for conditioning the wireless signal into a wired  
25 medium transmission signal for effective transmission over a wired network;  
26 connecting means for connecting the conditioning means to the wired network,  
27 whereby the received wireless signal is converted into the wired medium transmission  
28 signal and injected onto the wired network.  
29
- 30 141.) An antenna node device according to claim 140, further comprising; means for  
31 receiving a wired medium transmission signal from a wired network; second  
32 conditioning means for conditioning the received wired medium transmission signal  
33 into a wireless signal effective for wireless transmission; and emitting means for  
34 emitting the wireless signal, whereby the received wired medium transmission signal is  
35 converted into the wireless signal and emitted for reception by a remote wireless device.

- 1 142.) An antenna node device according to claim 140; wherein the first conditioning  
2 means comprising an down-converter and the second conditioning means comprises a  
3 up-converter.
- 4 143.) An antenna node according to claim 142; wherein the up-converter is effective  
5 for converting a received 900 MHz band signal to a 2.4 Ghz band signal; and the down-  
6 converter is effective for converting a received 2.4 Ghz band signal to a 900 Mhz band  
7 signal.  
8



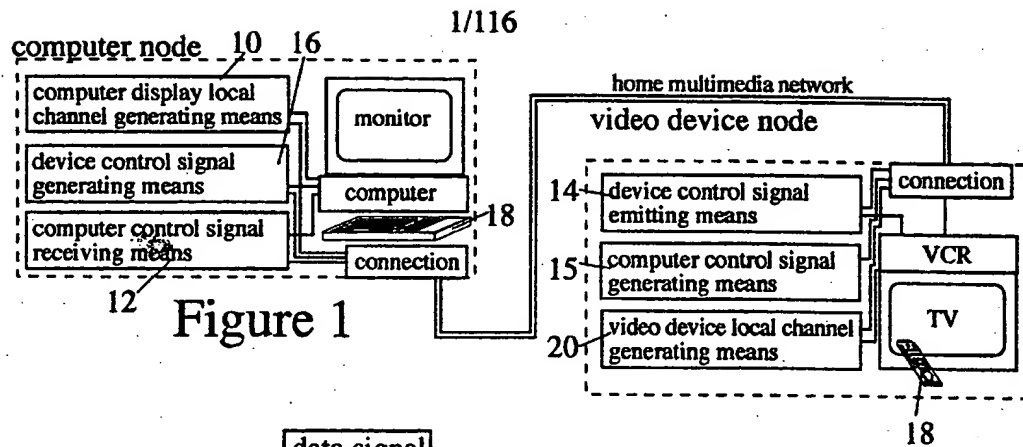


Figure 1

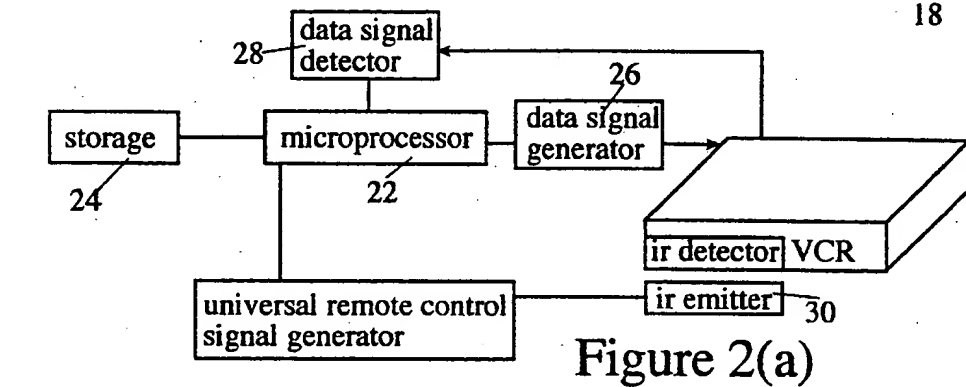


Figure 2(a)

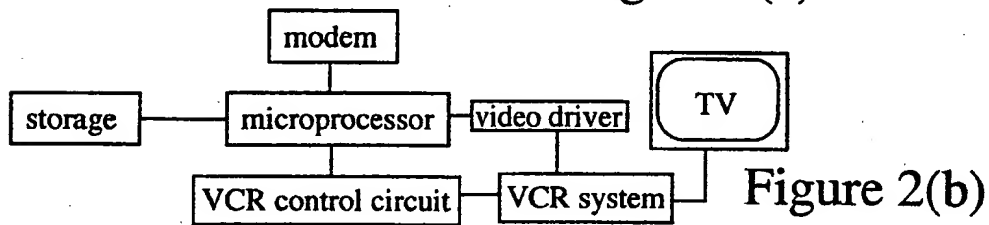


Figure 2(b)

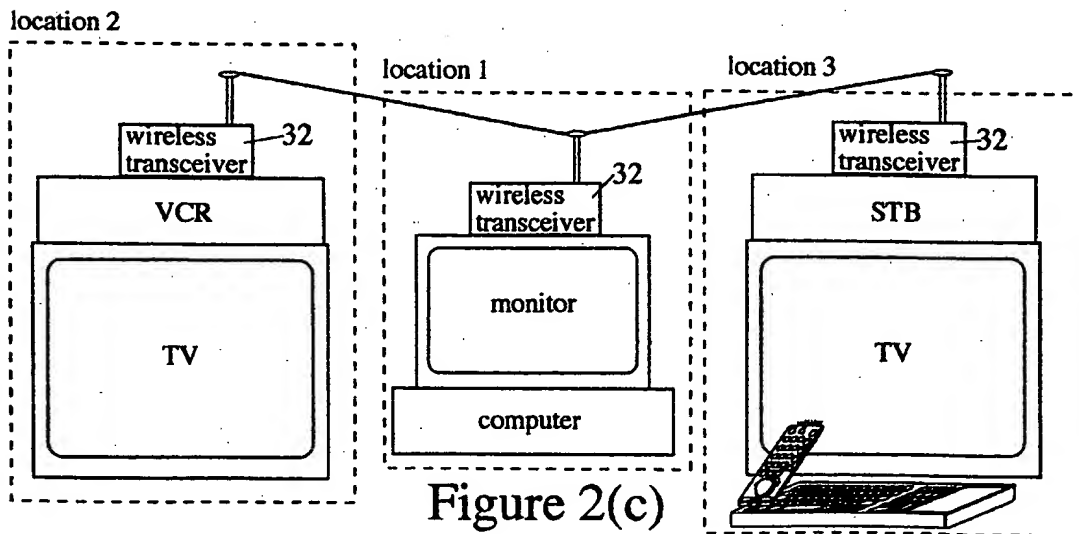
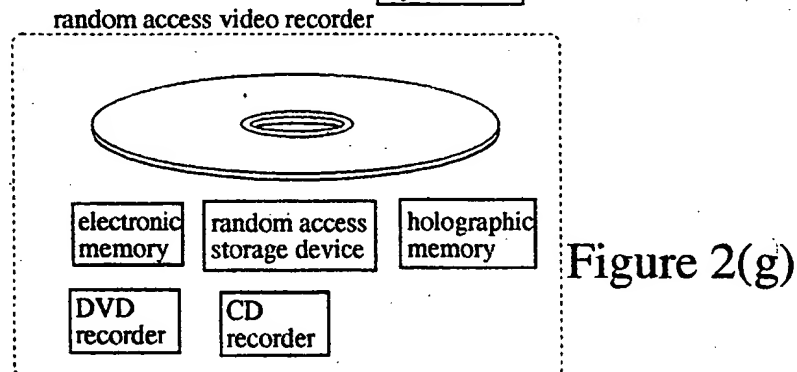
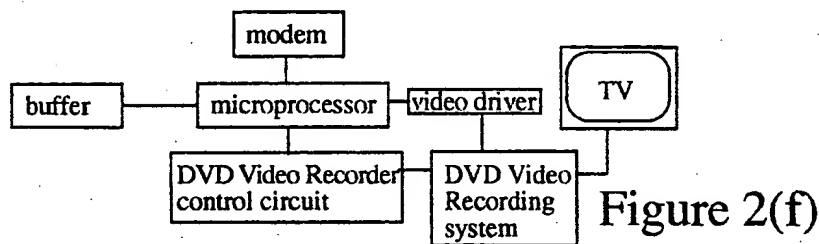
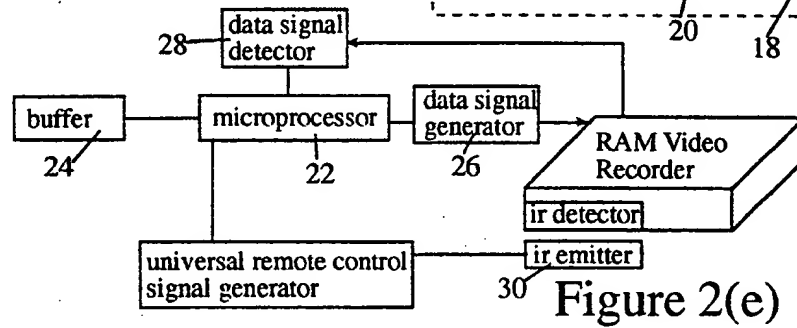
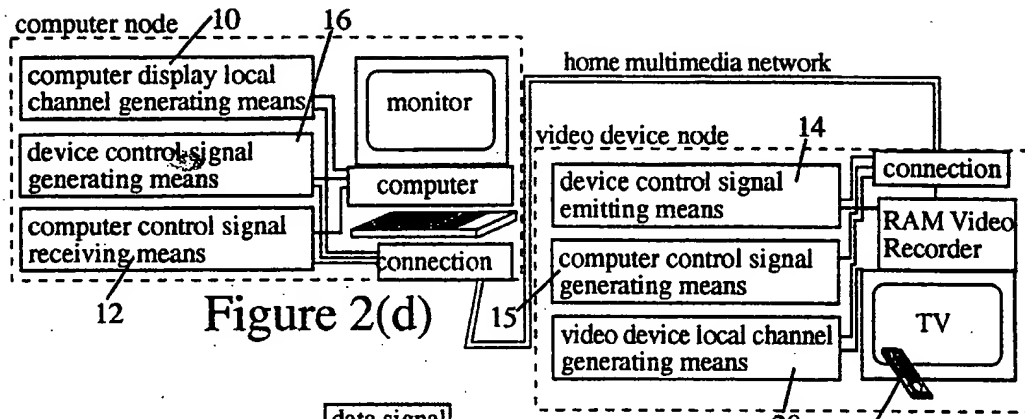
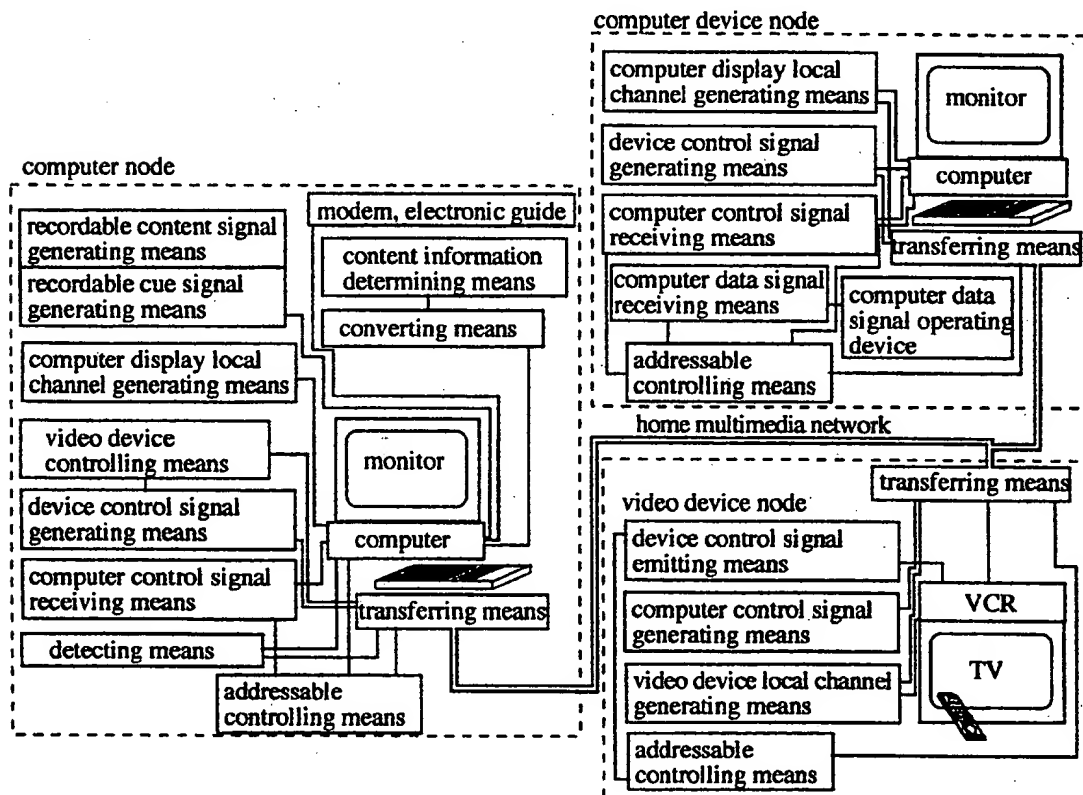
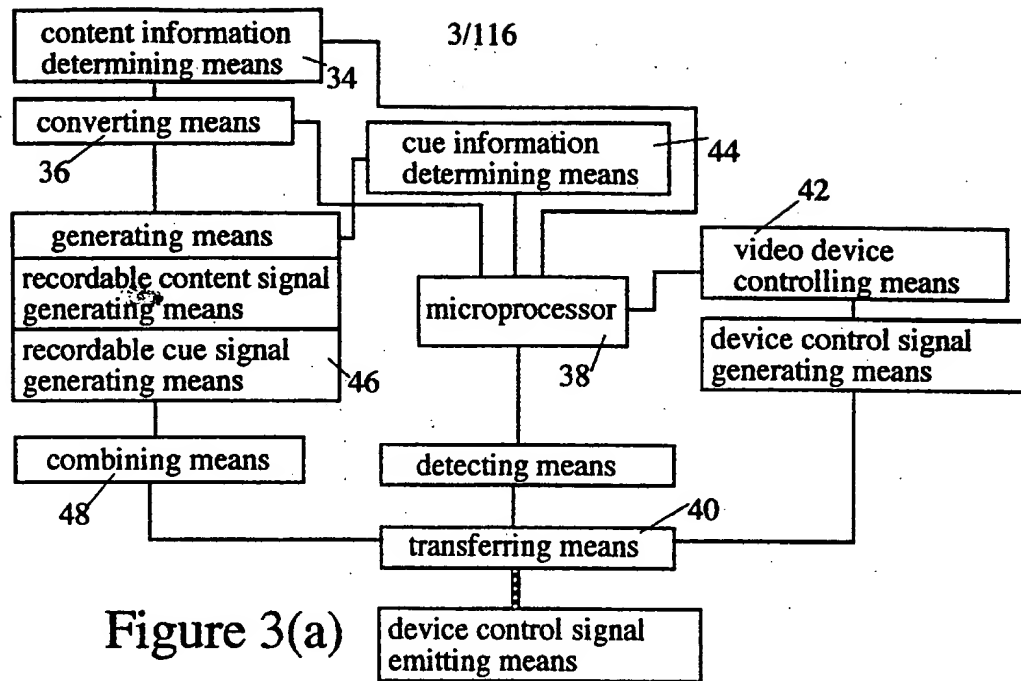
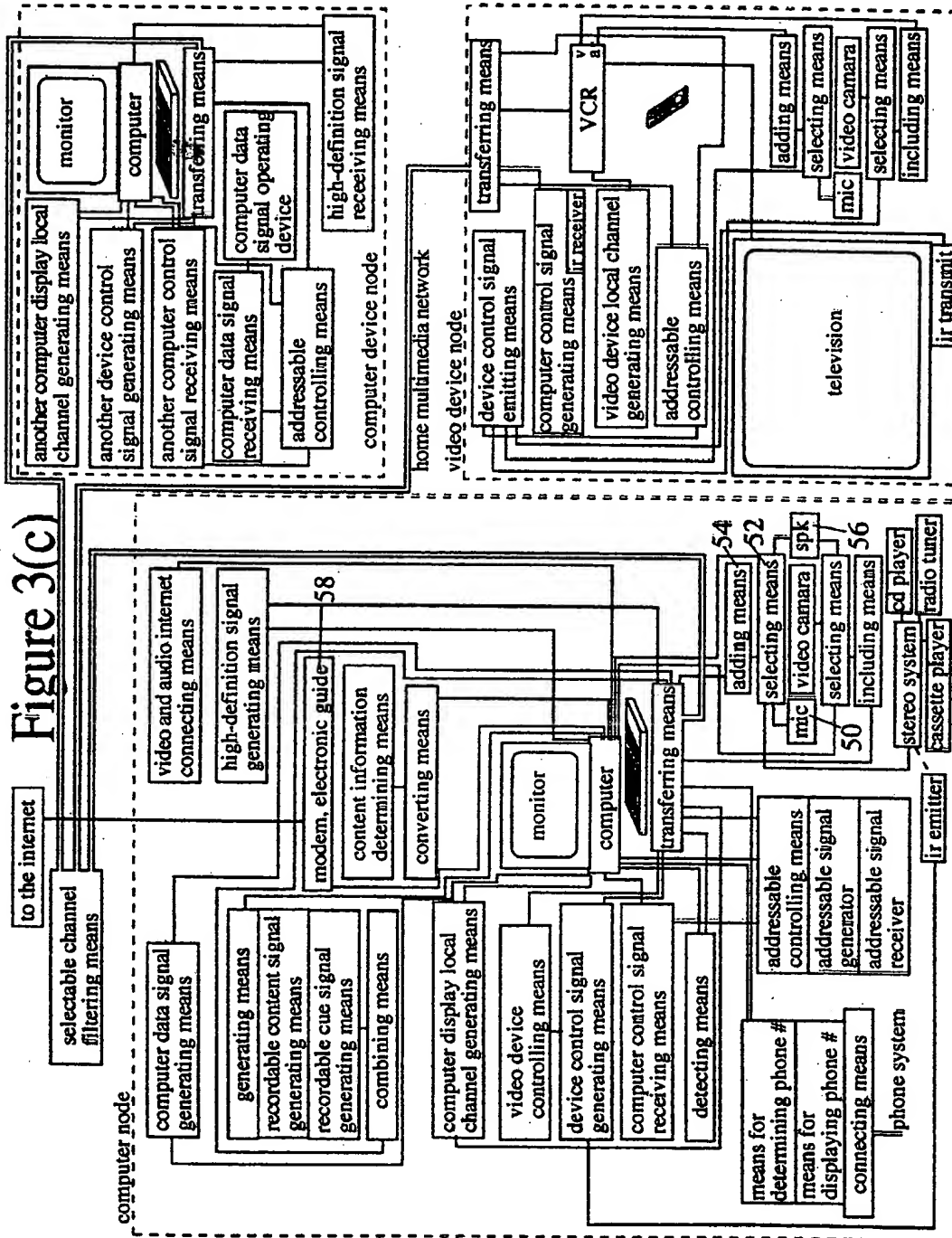


Figure 2(c)

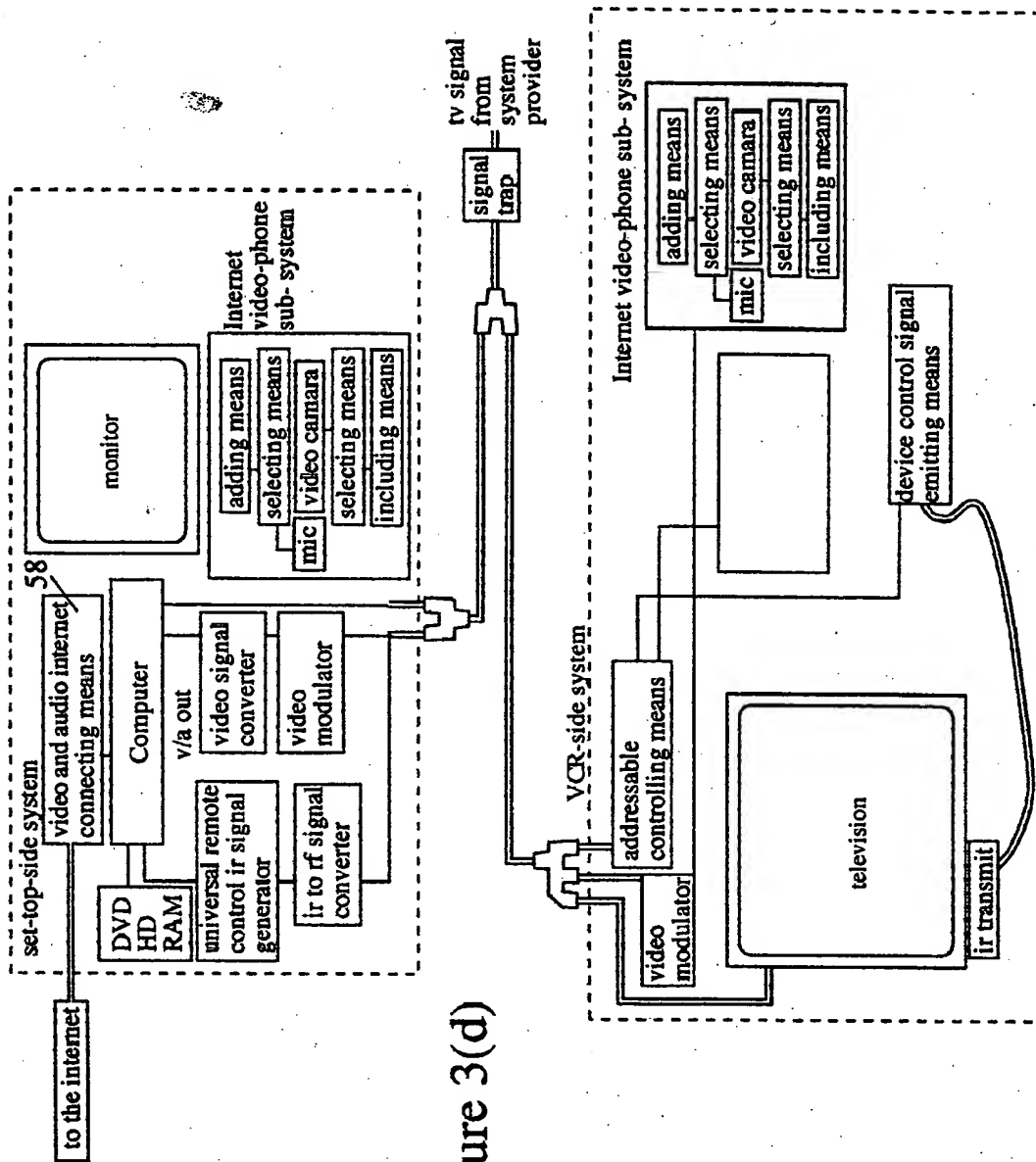
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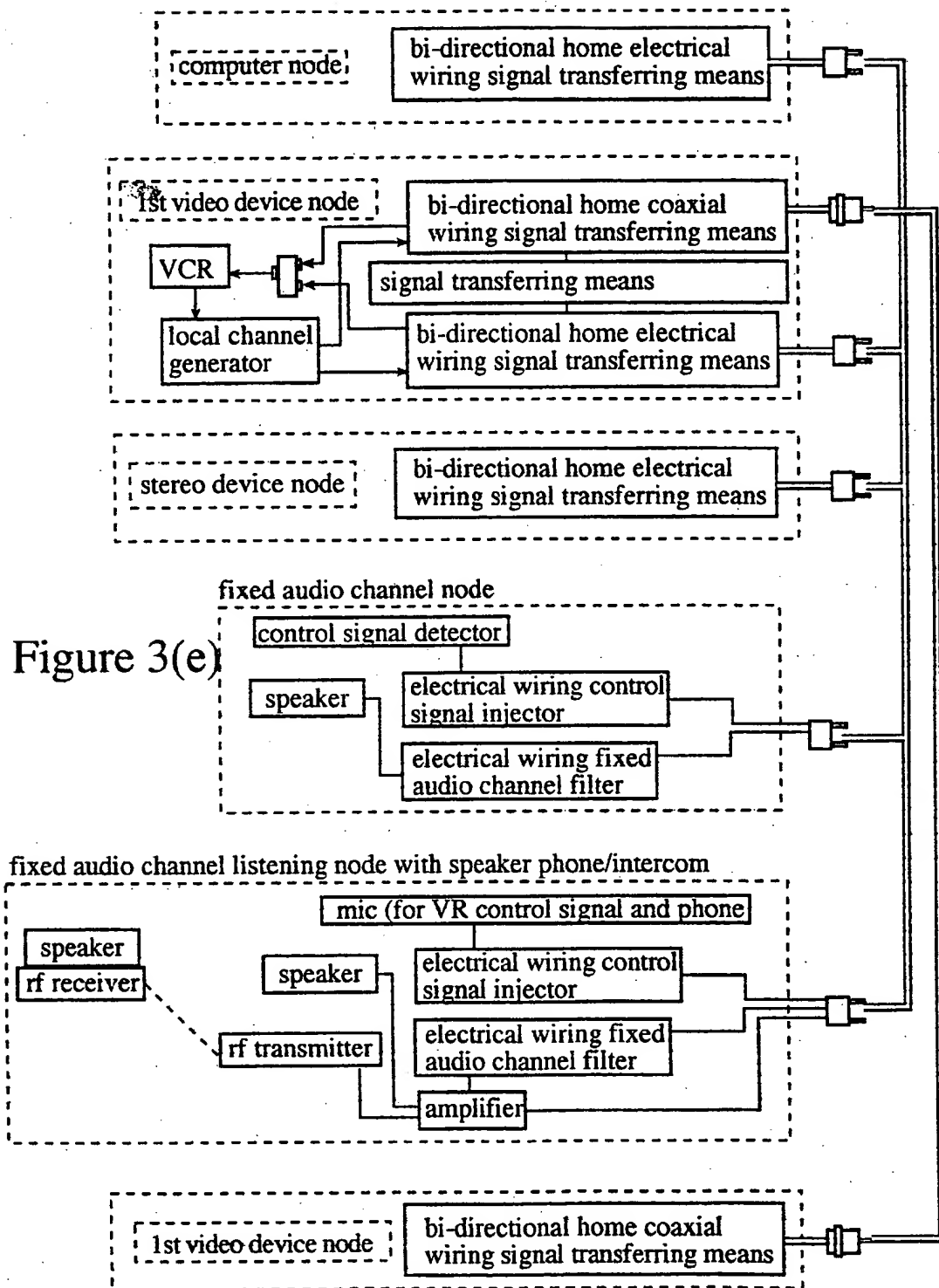




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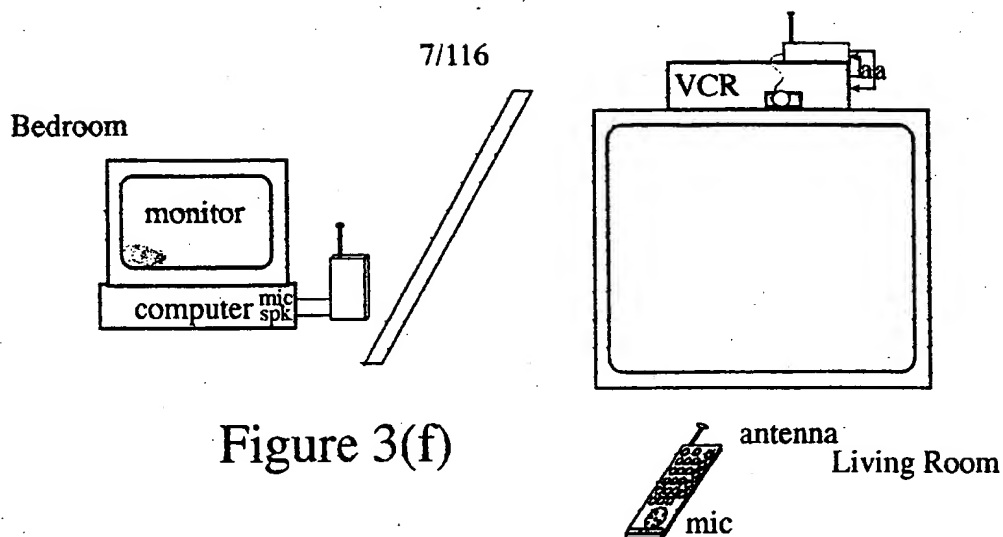


Figure 3(f)

button1	frequency1	pulse train1	stop
button2	frequency2	pulse train2	play
button3	frequency3	pulse train3	record
button4	frequency4	pulse train4	pause
button5	frequency5	pulse train5	fast forward
button6	frequency6	pulse train6	channel up
button7	frequency7	pulse train7	channel down
button8	frequency8	pulse train8	
button9	frequency9	pulse train9	
button10	frequency10	pulse train10	
button11	frequency11	pulse train11	
button12	frequency12	pulse train12	

Figure 3(g)

example  
vcr and tv  
controls

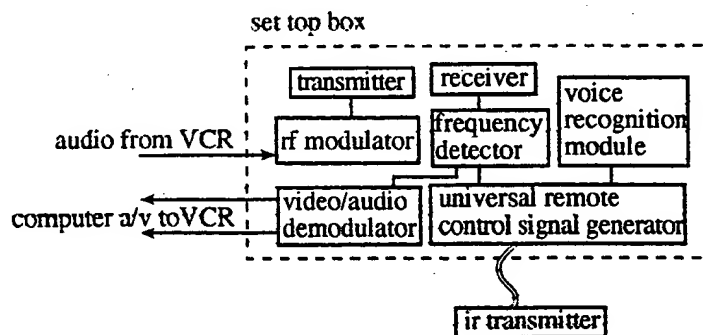
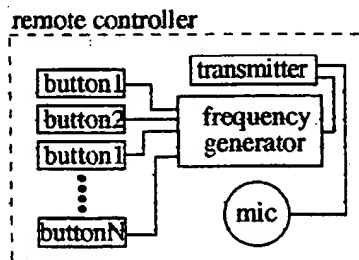


Figure 3(h)



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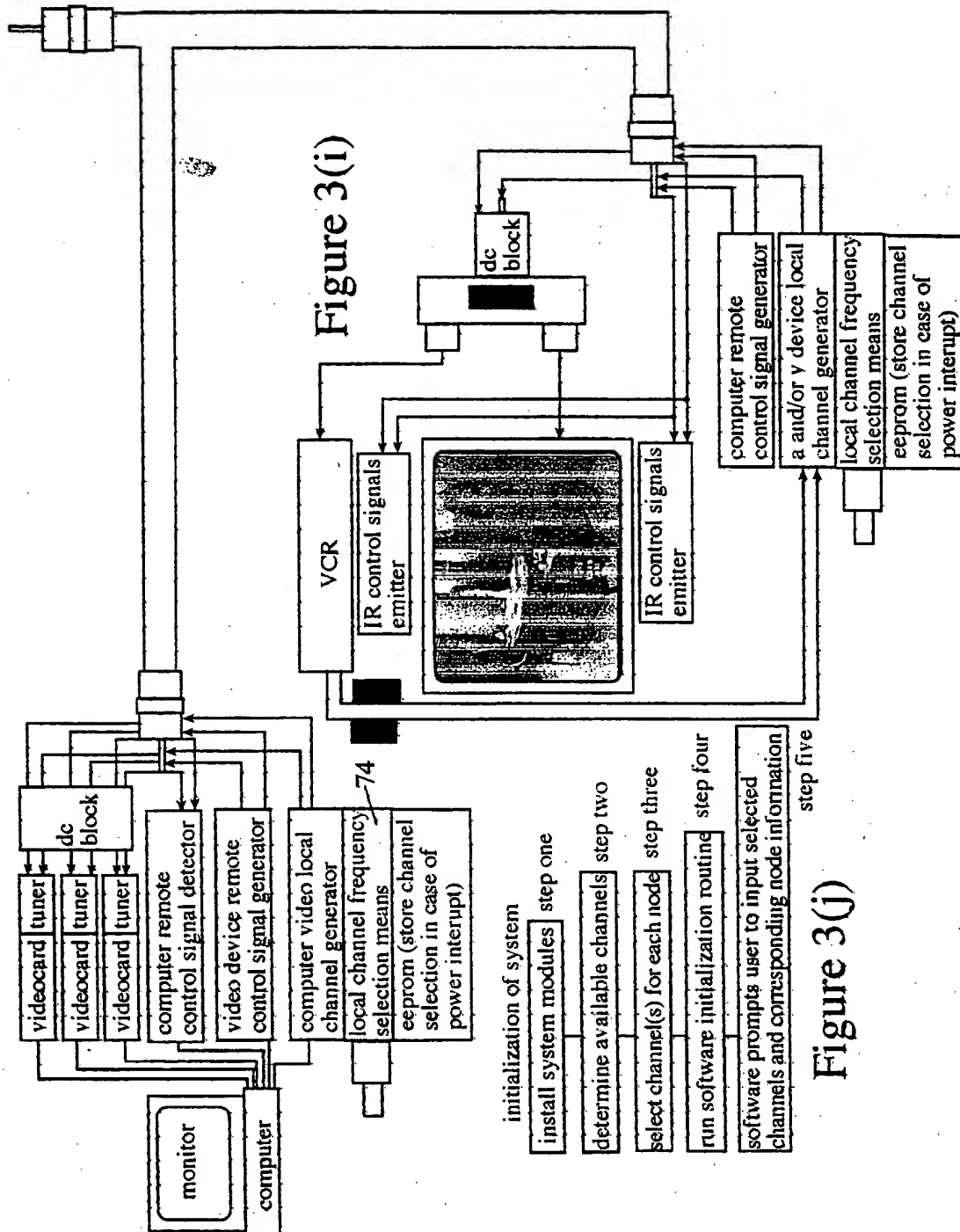
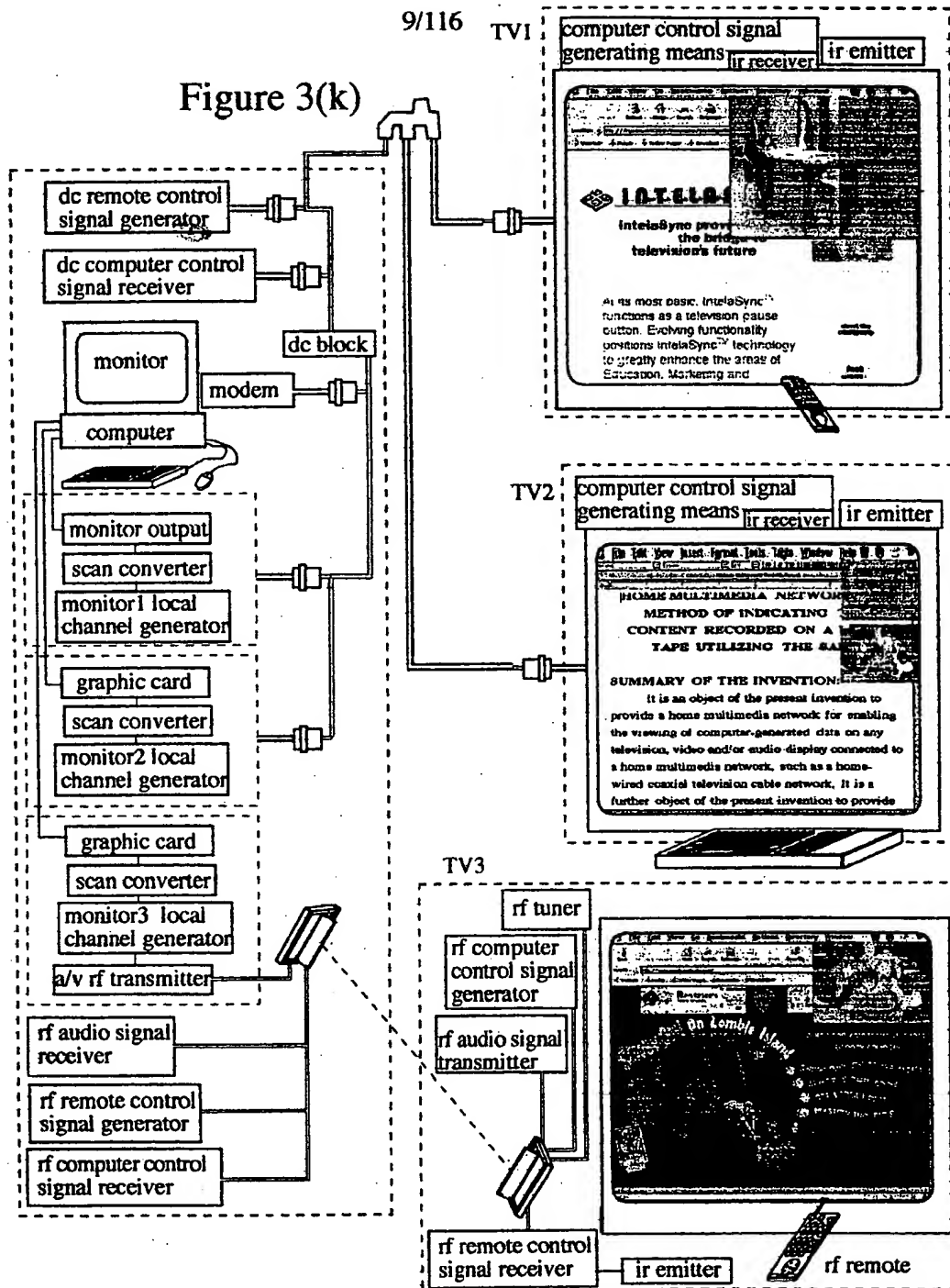




Figure 3(k)



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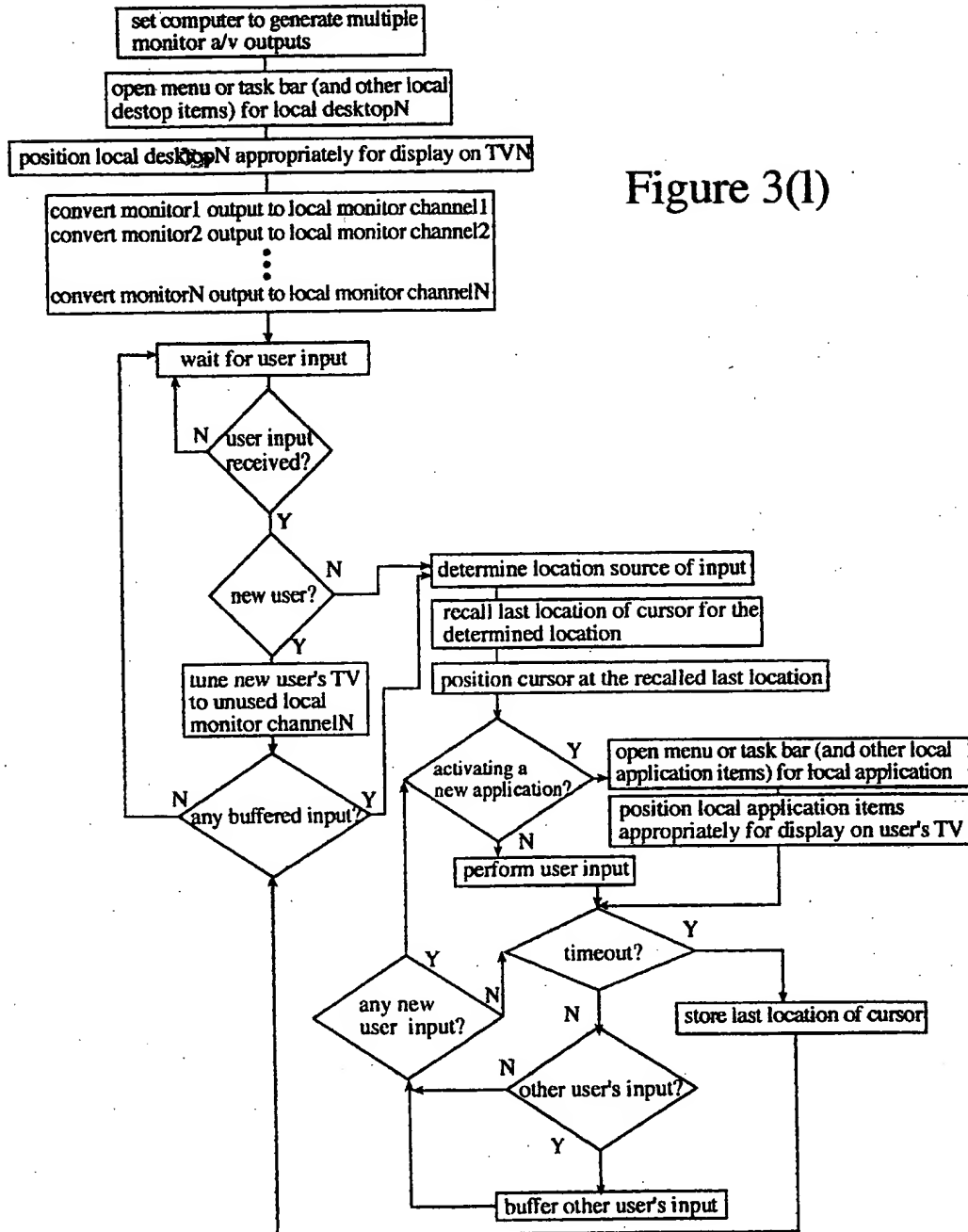
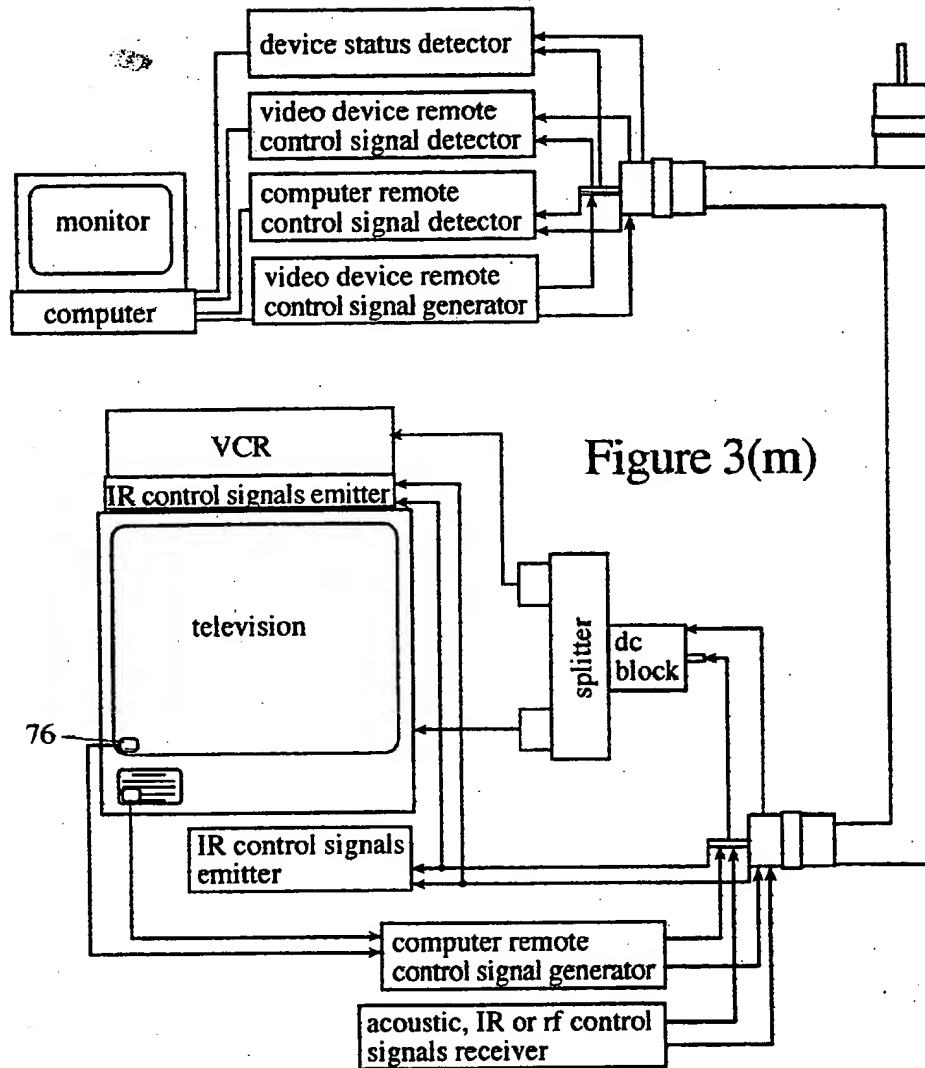


Figure 3(1)

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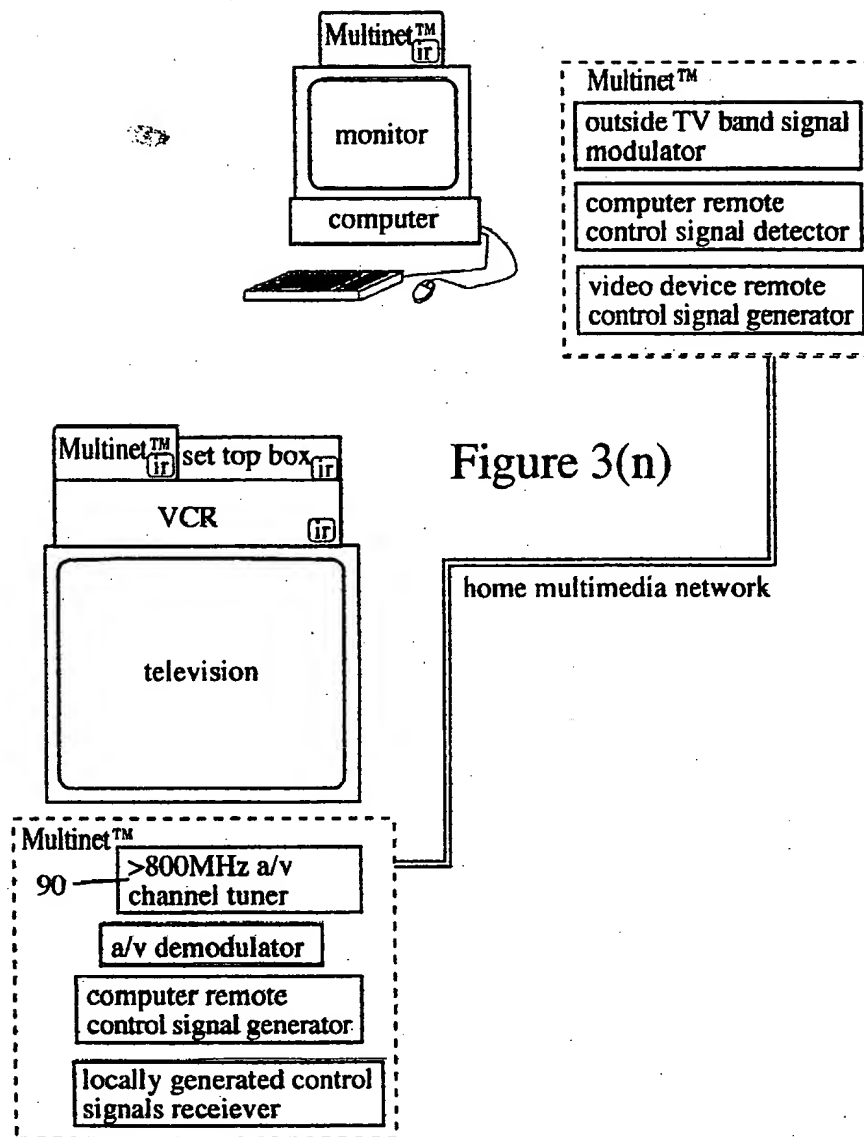
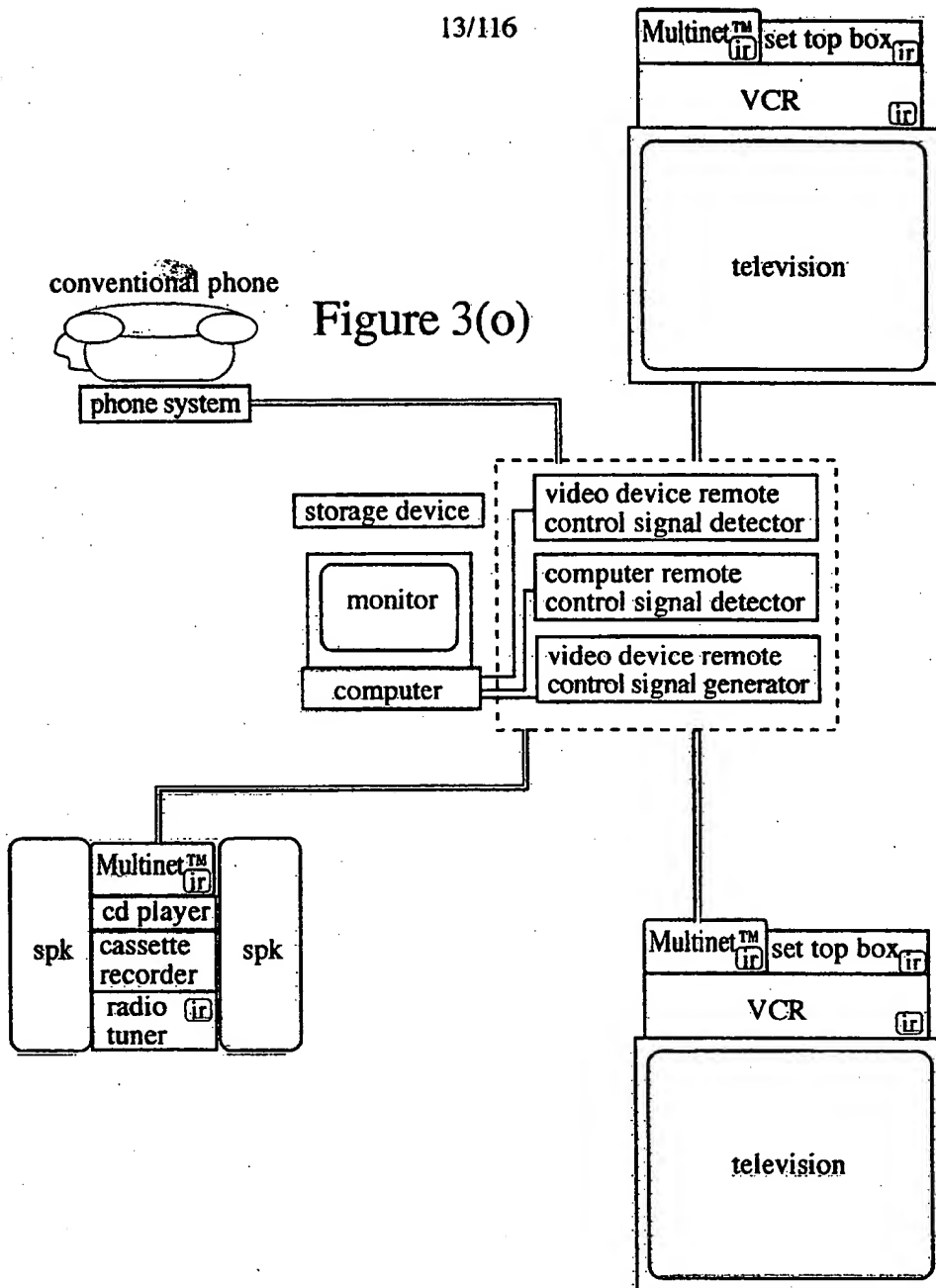
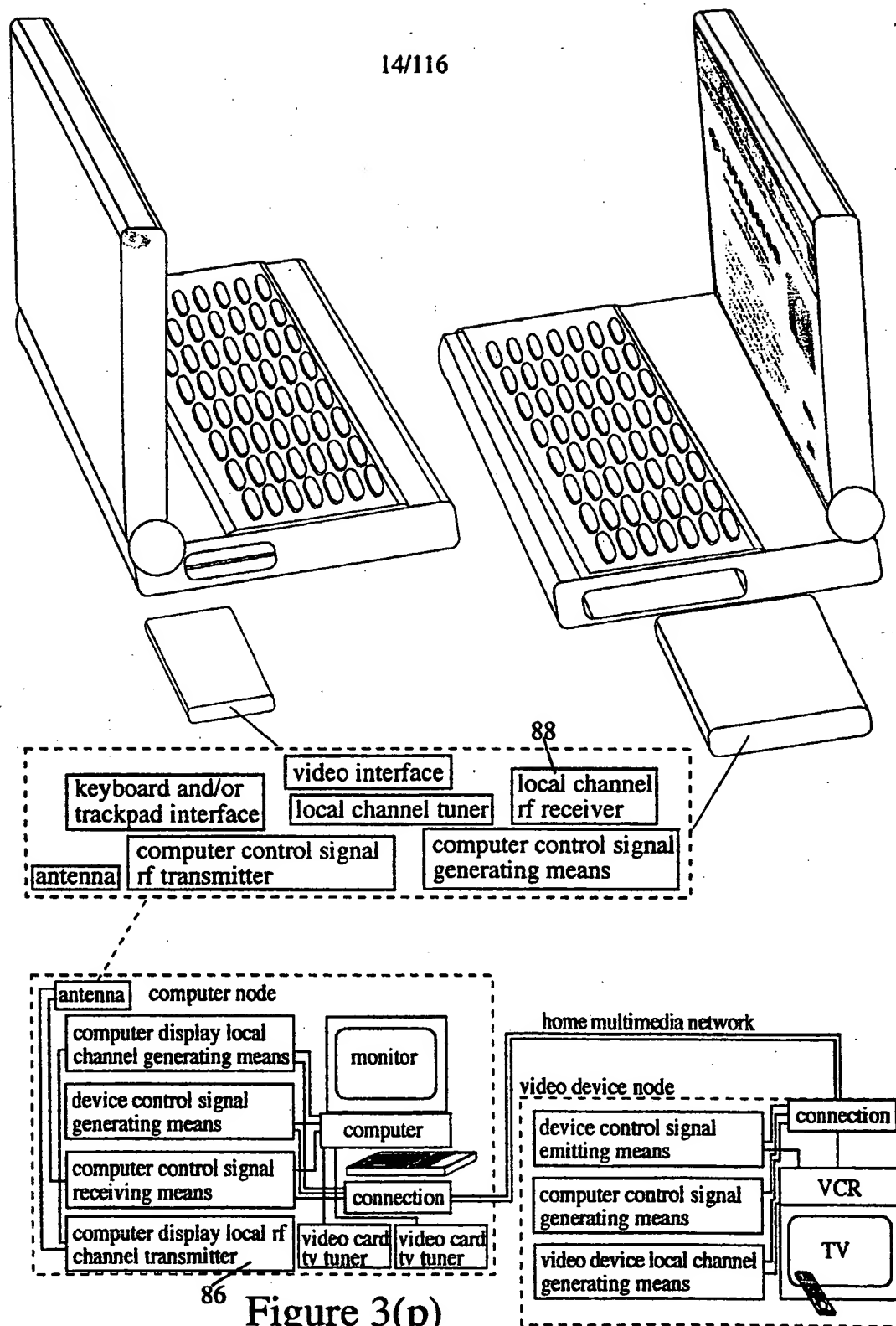


Figure 3(n)

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86 Figure 3(p)

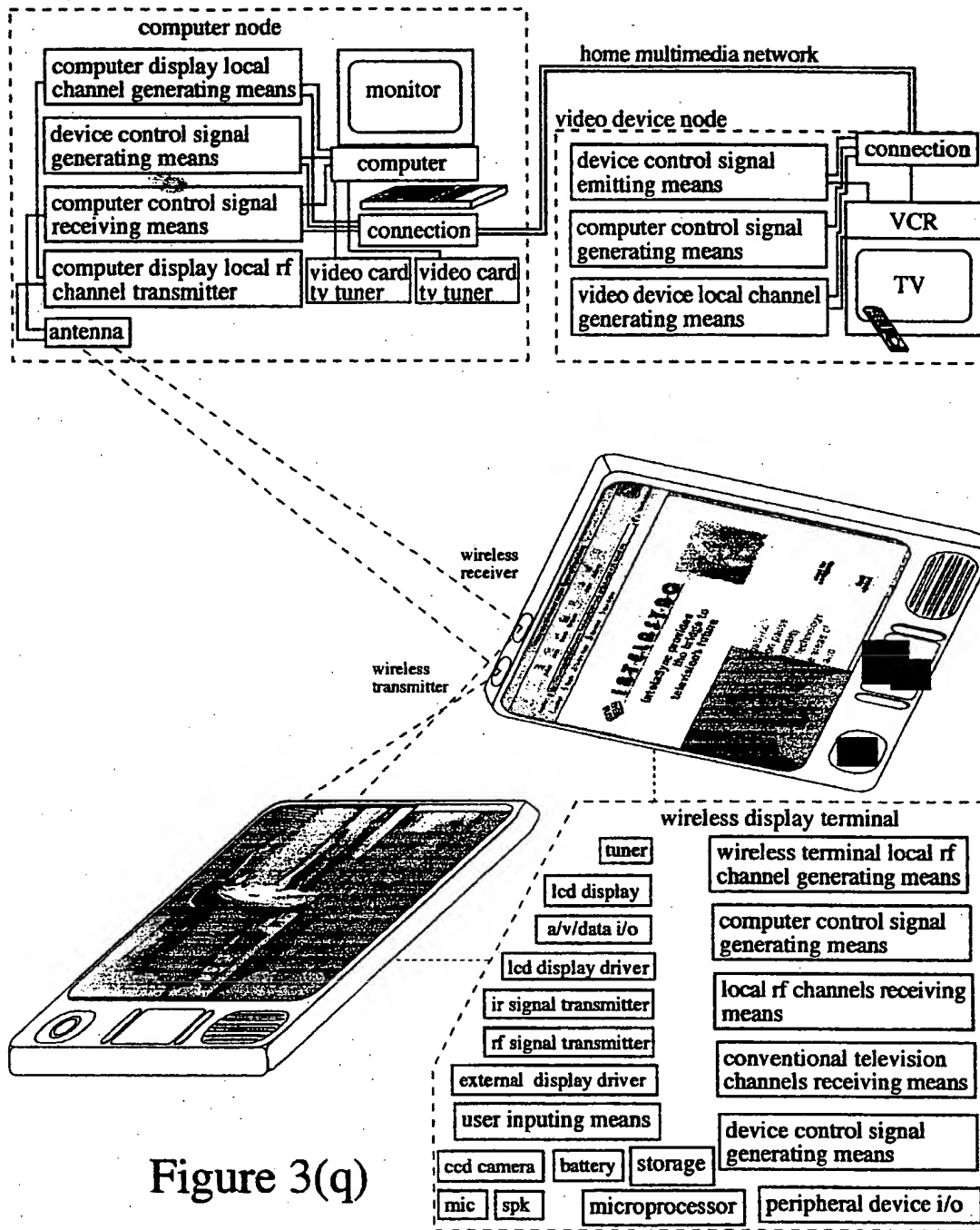


Figure 3(q)

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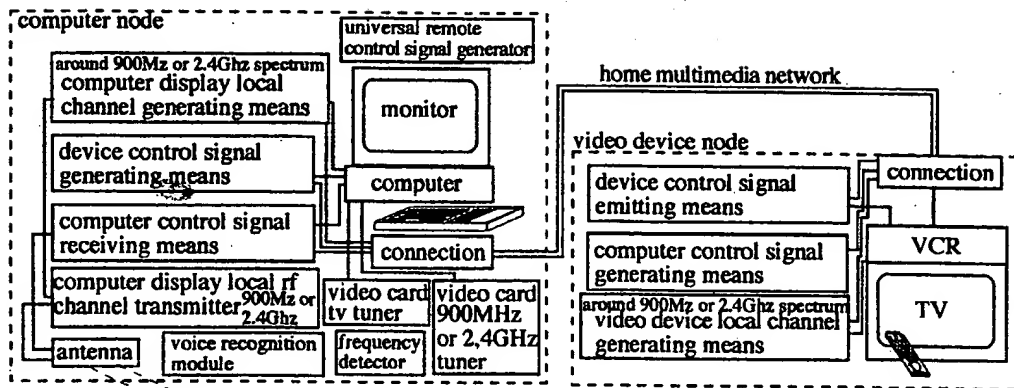
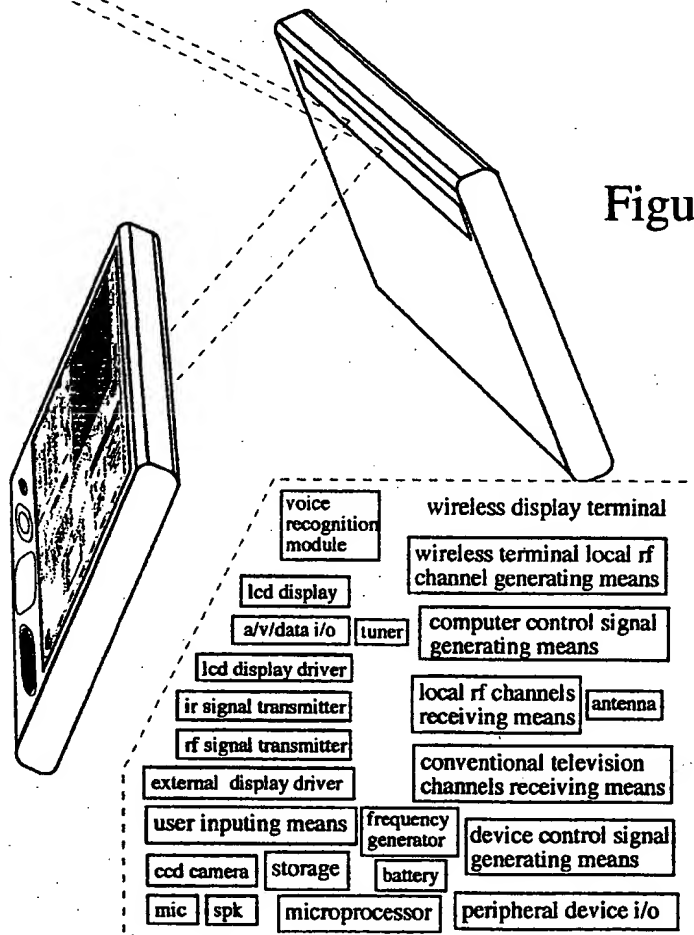


Figure 3(r)





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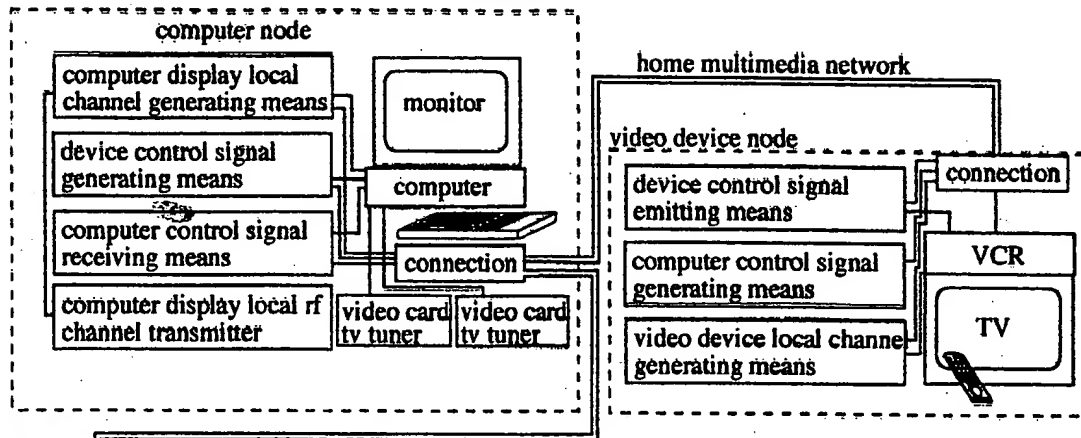
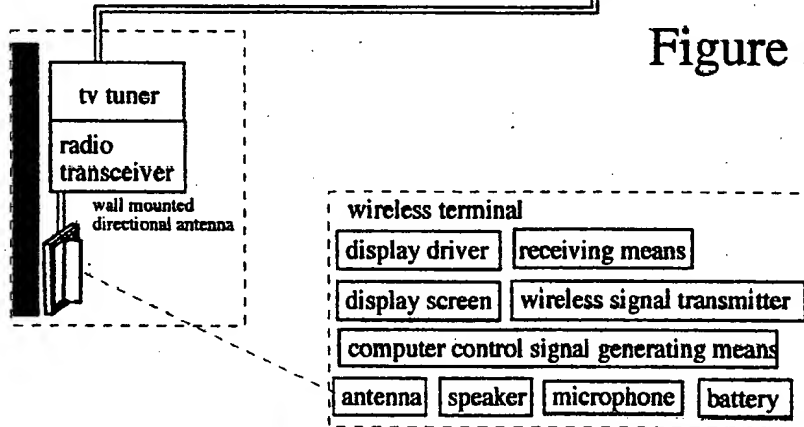
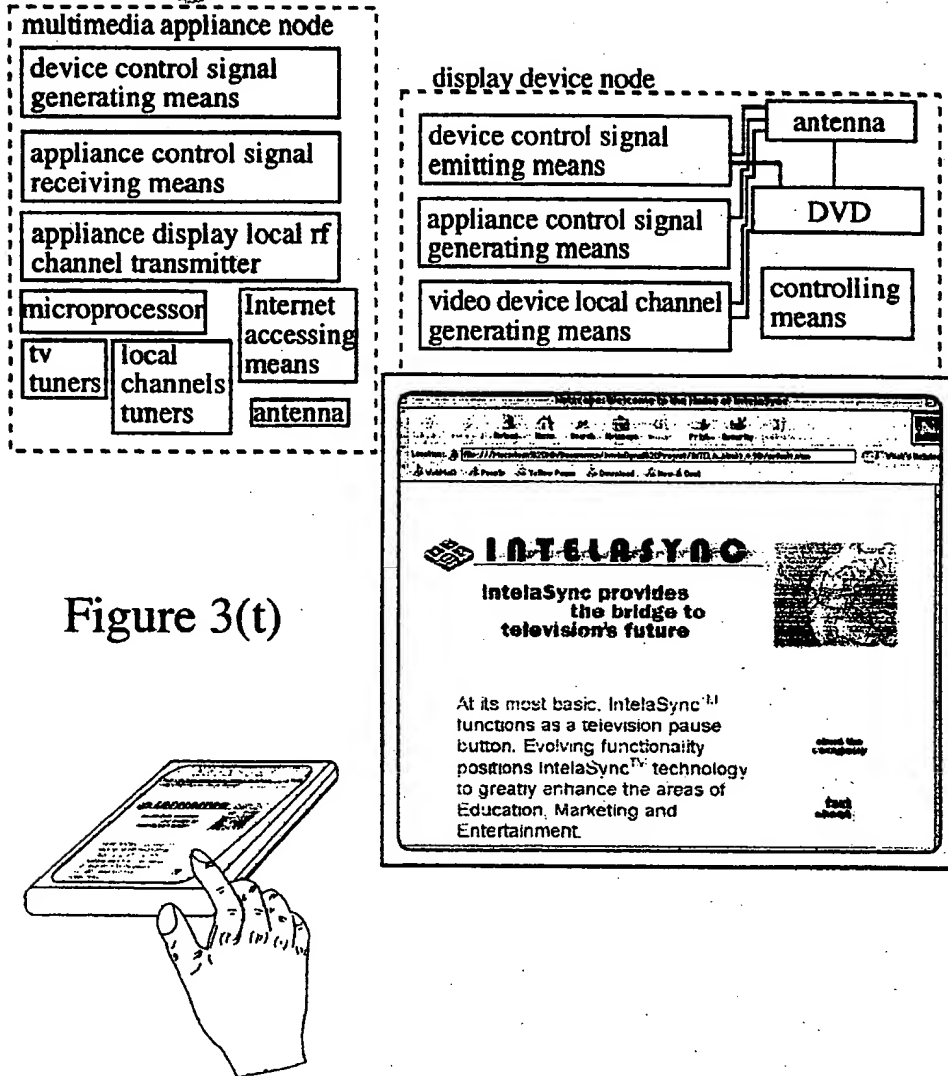
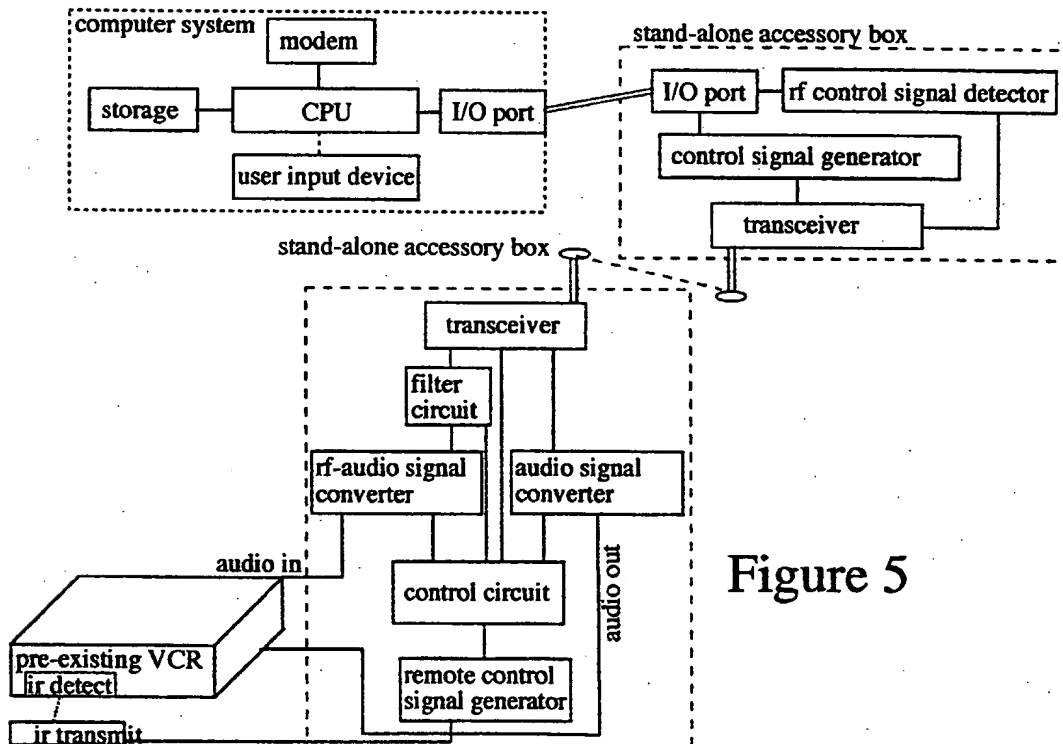
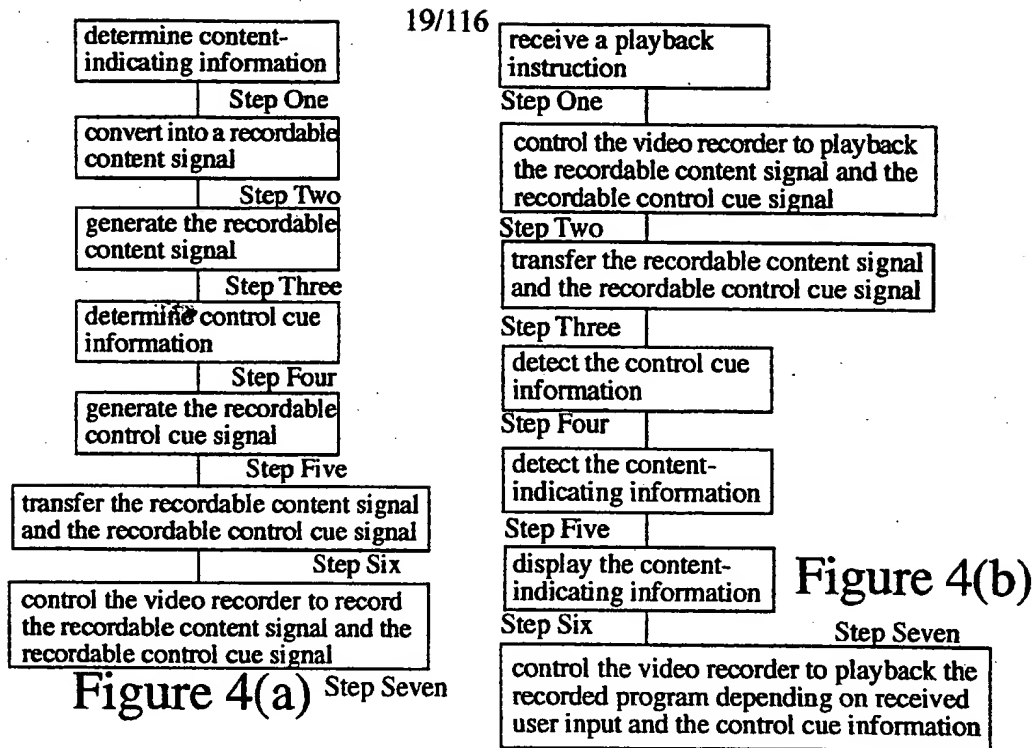


Figure 3(s)



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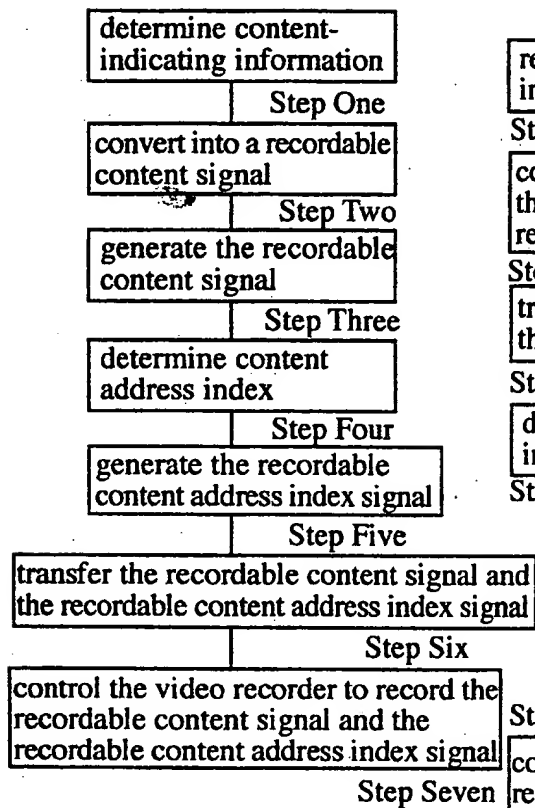


Figure 4(c)

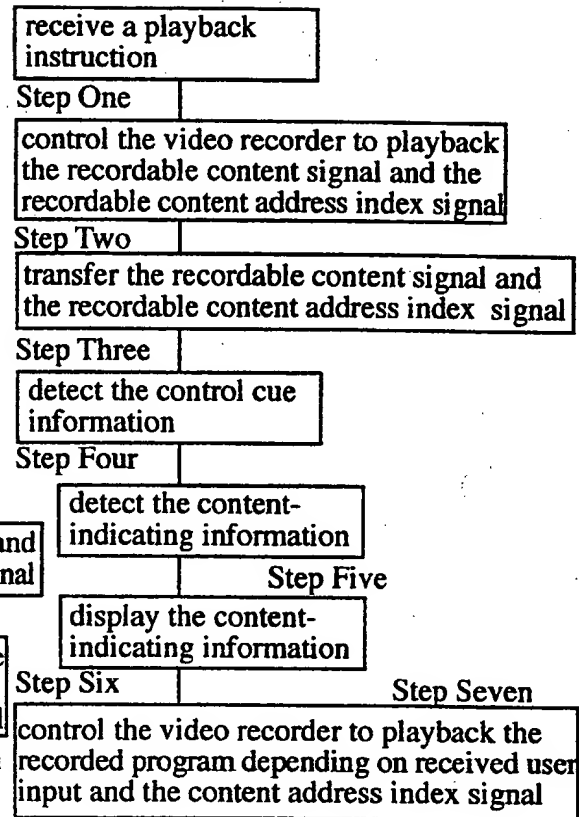


Figure 4(d)

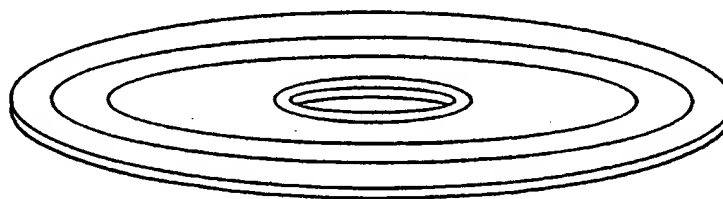
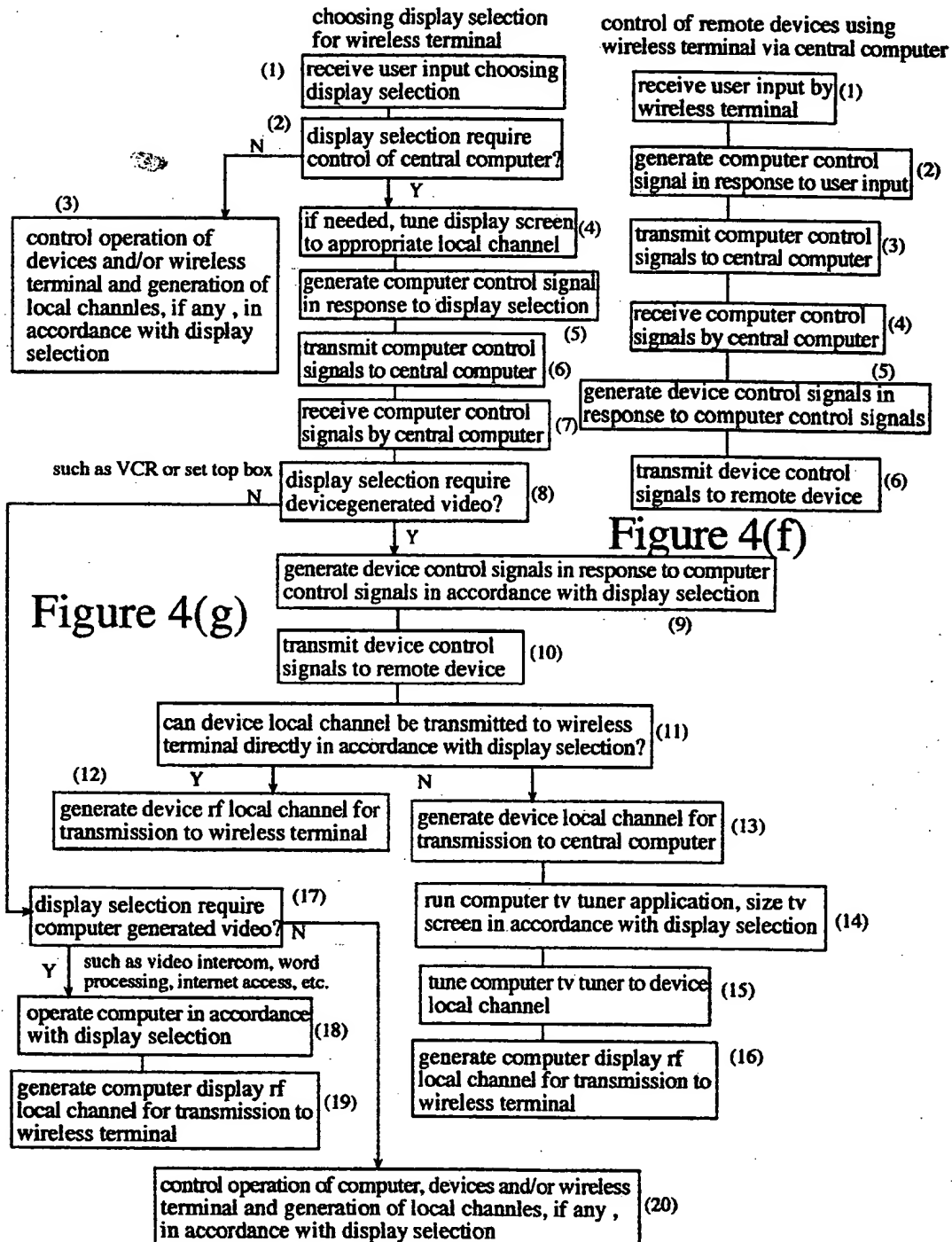


Figure 4(e)

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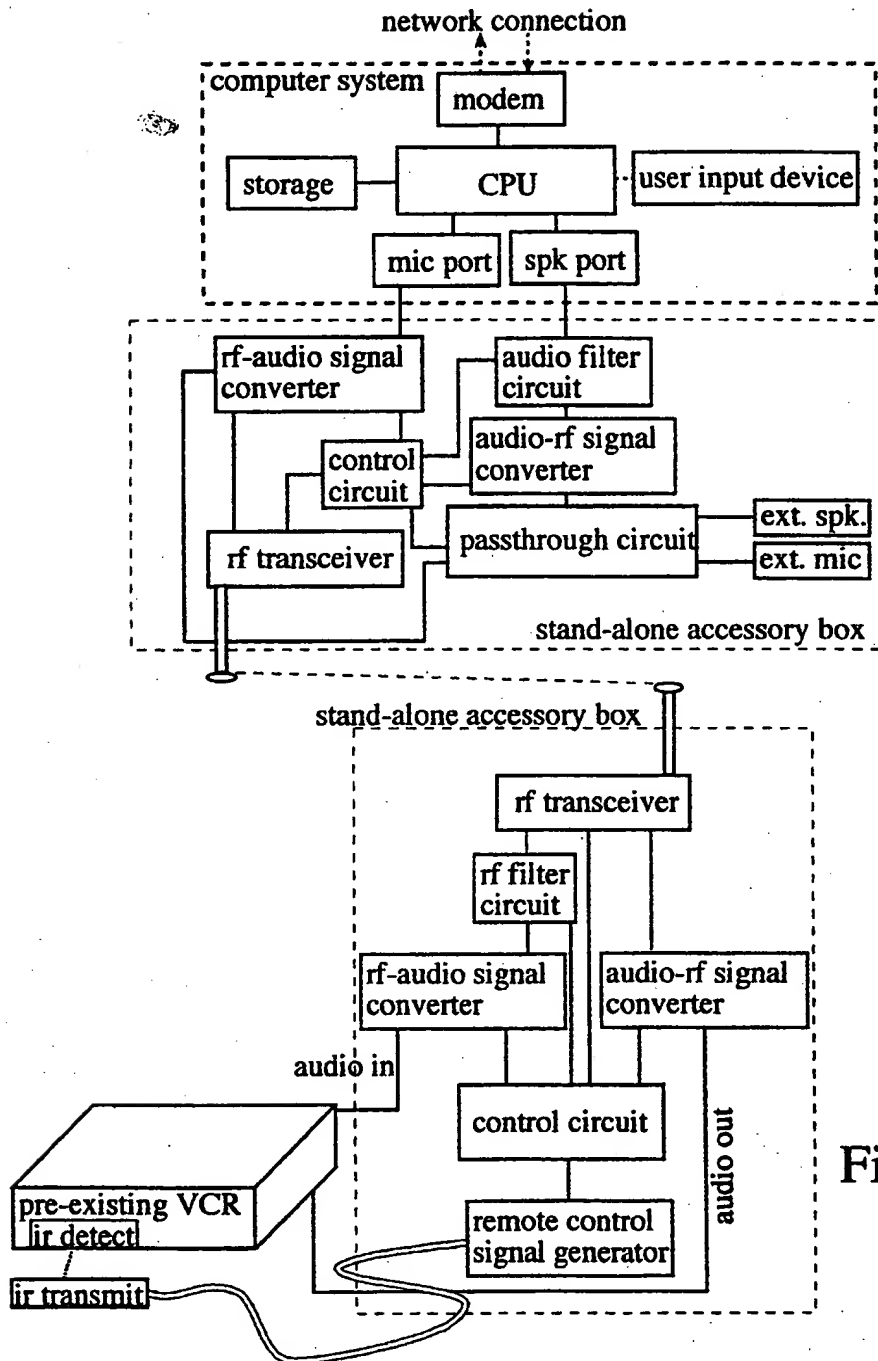


Figure 6

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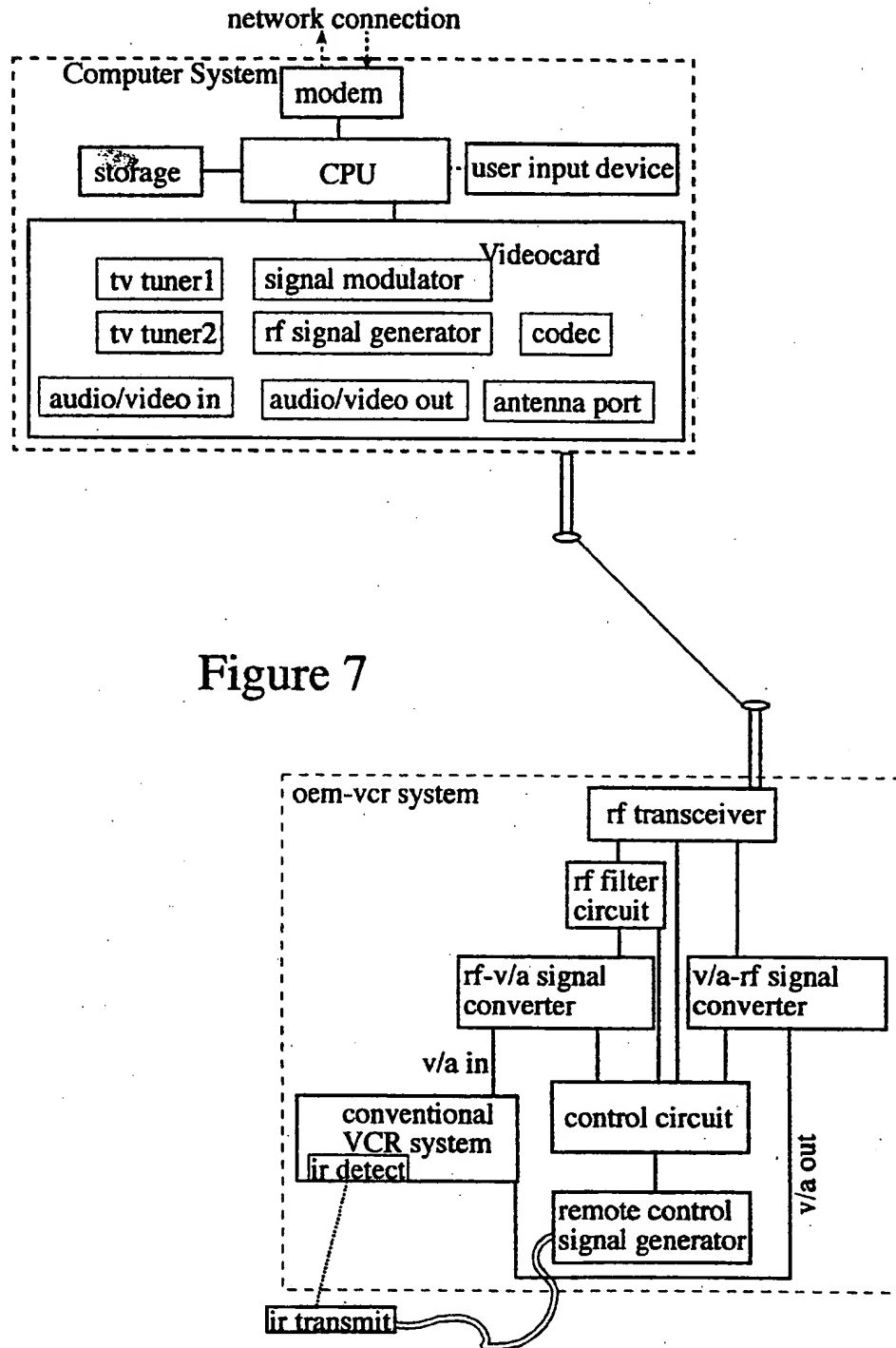


Figure 7

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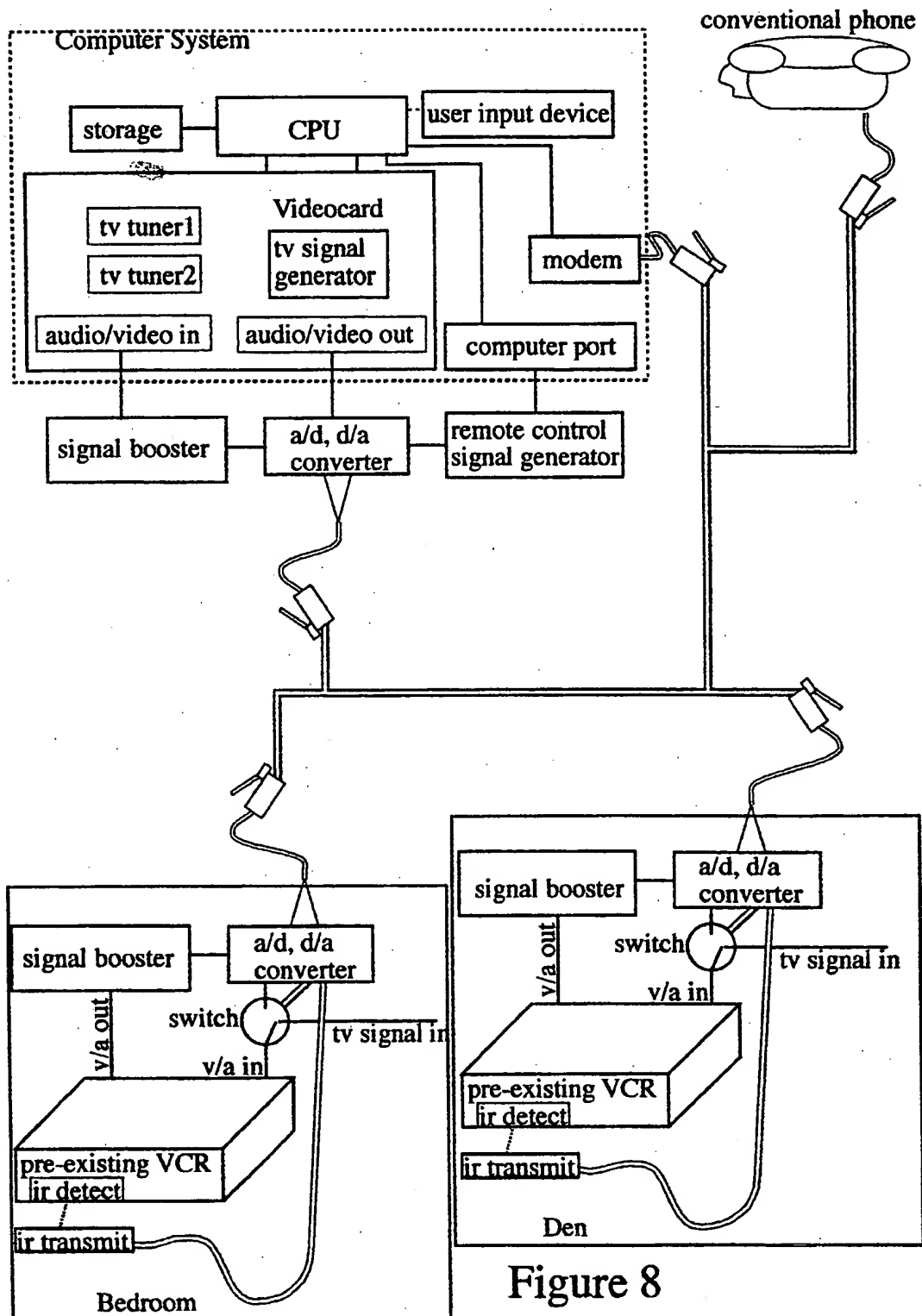
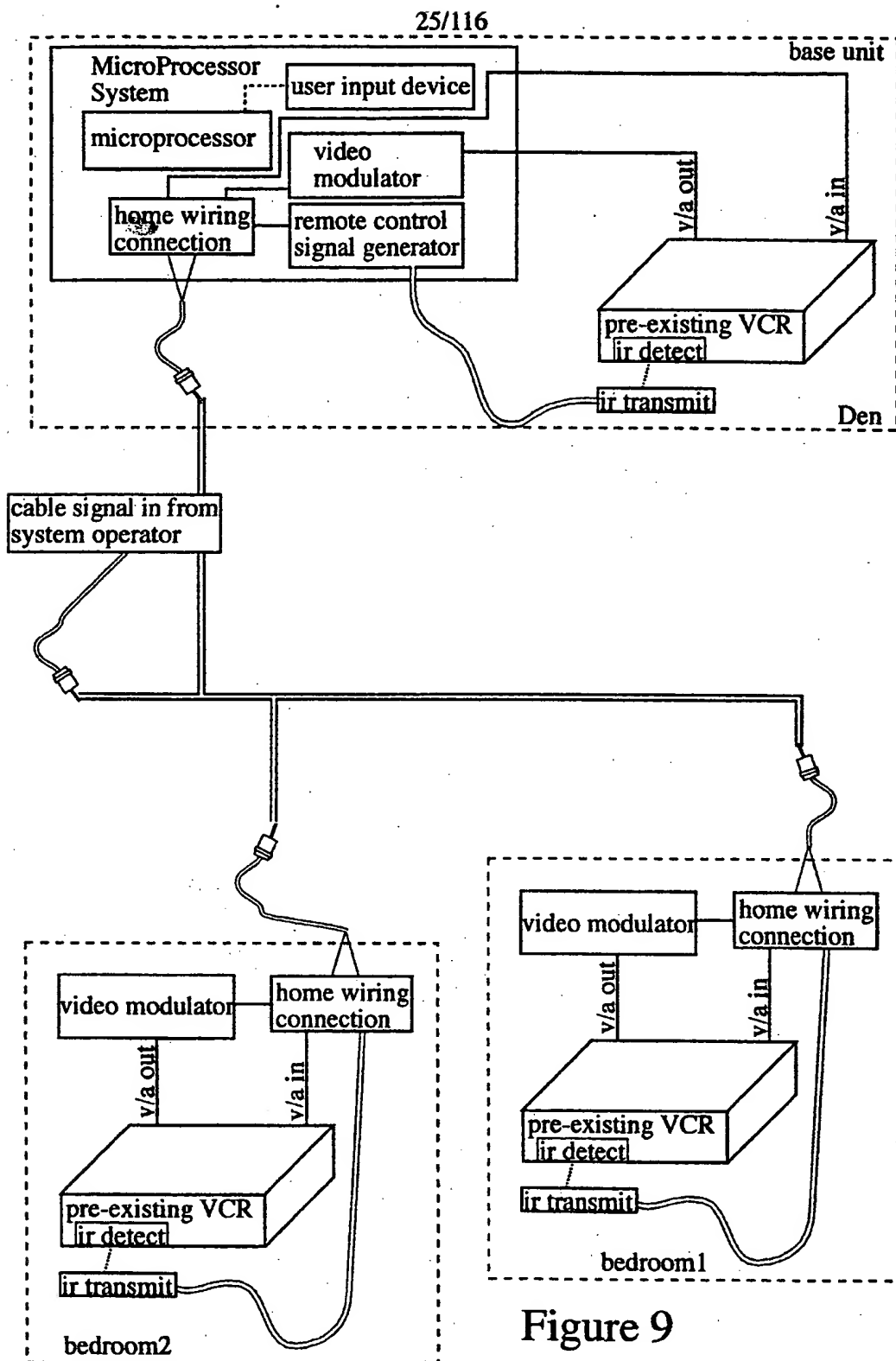


Figure 8





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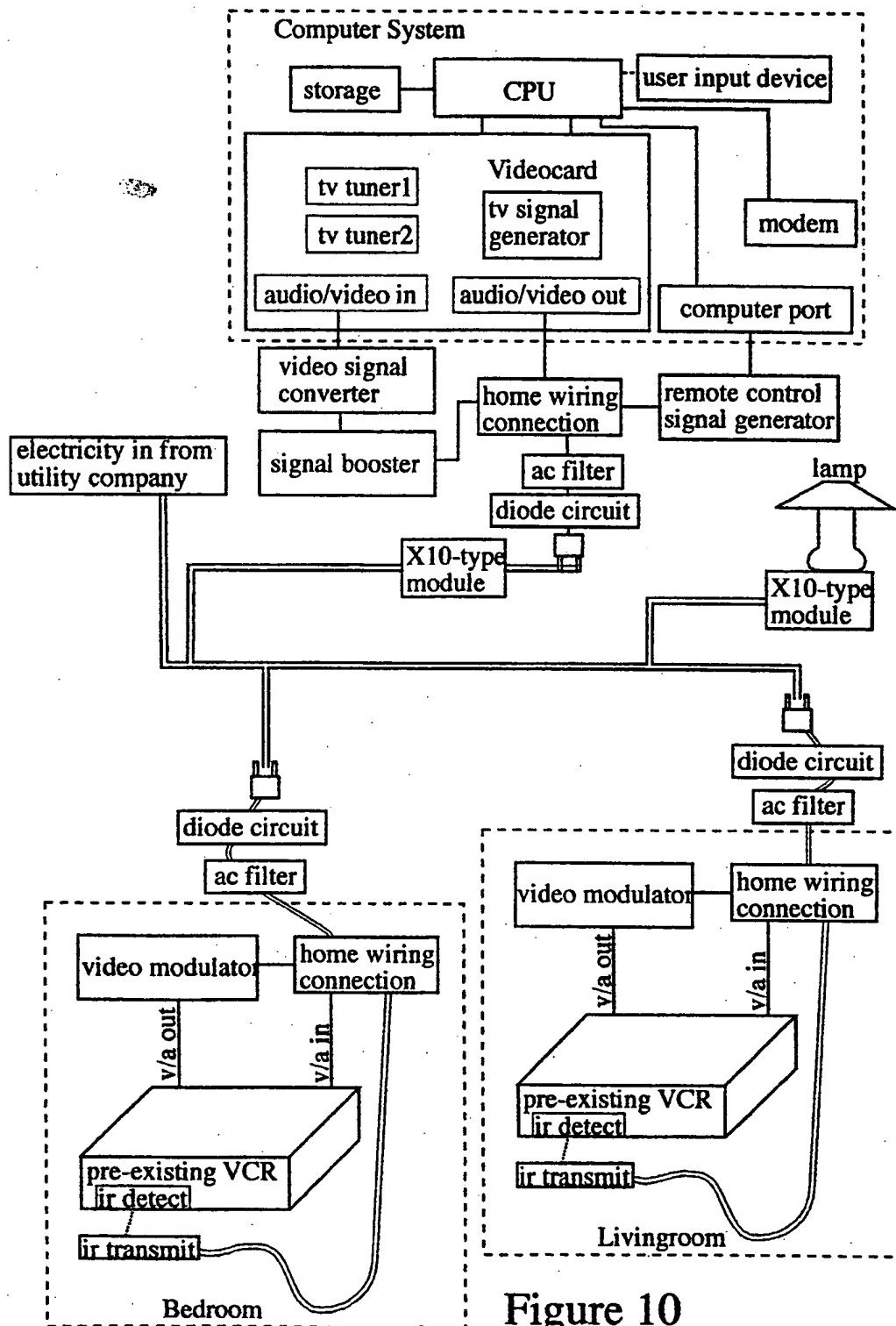


Figure 10

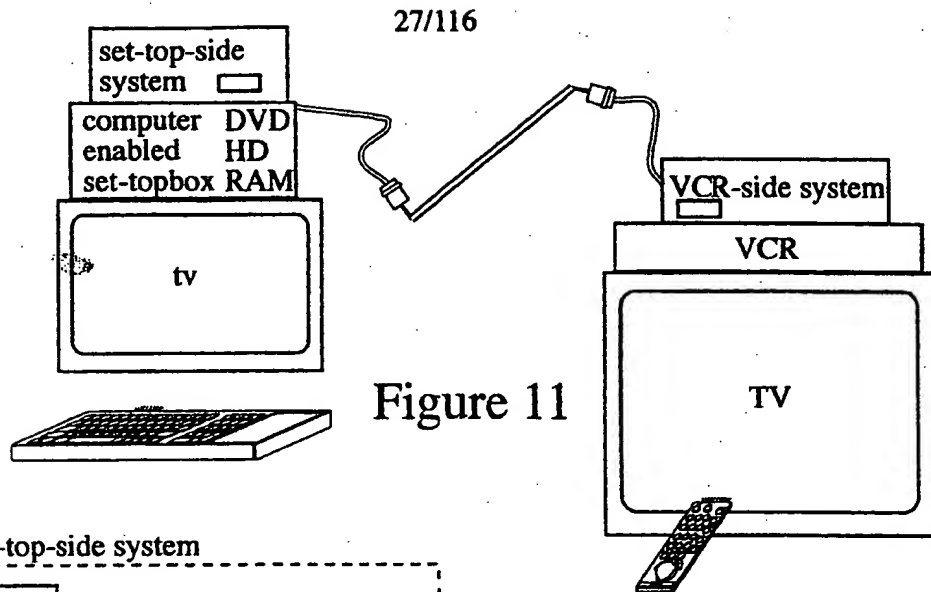
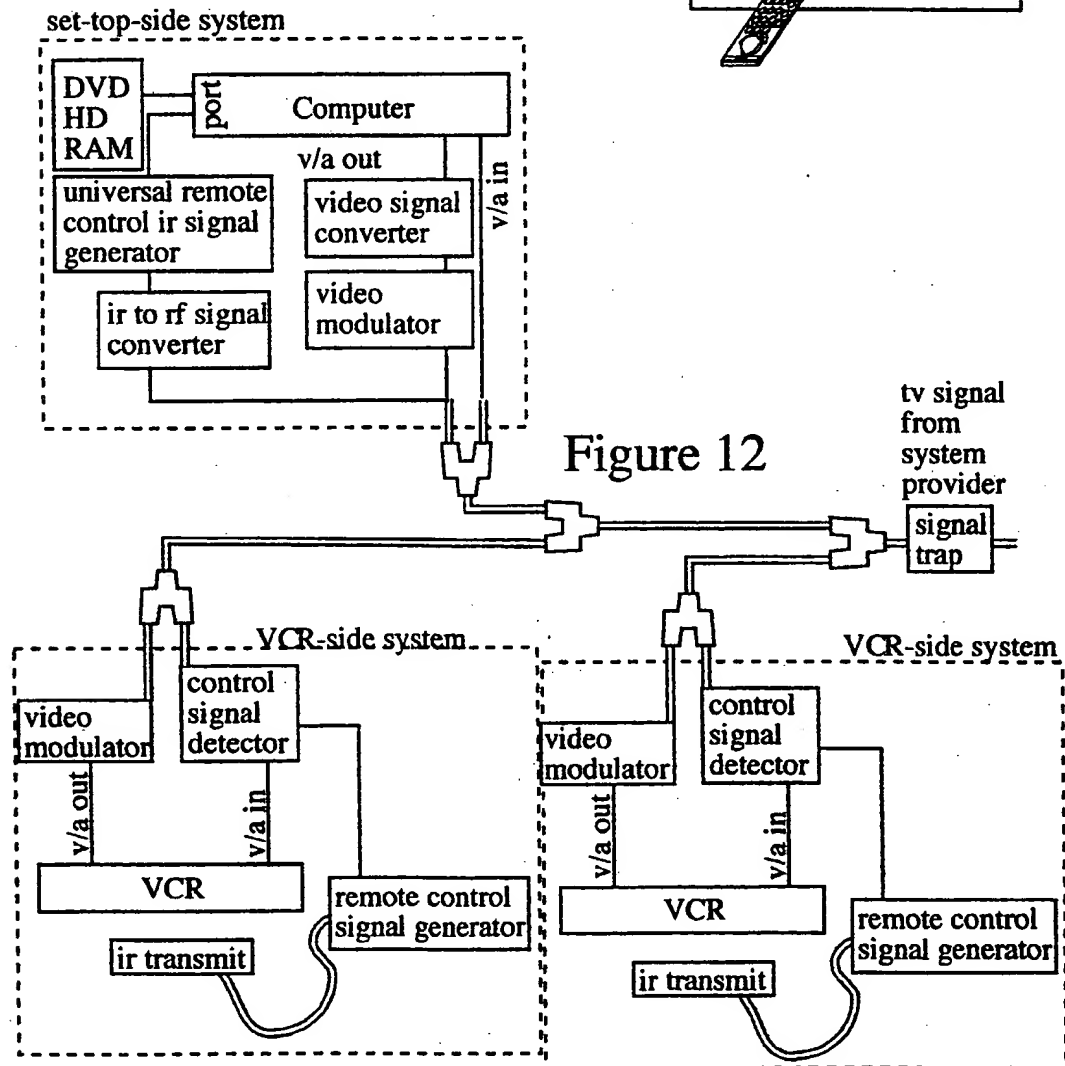


Figure 11



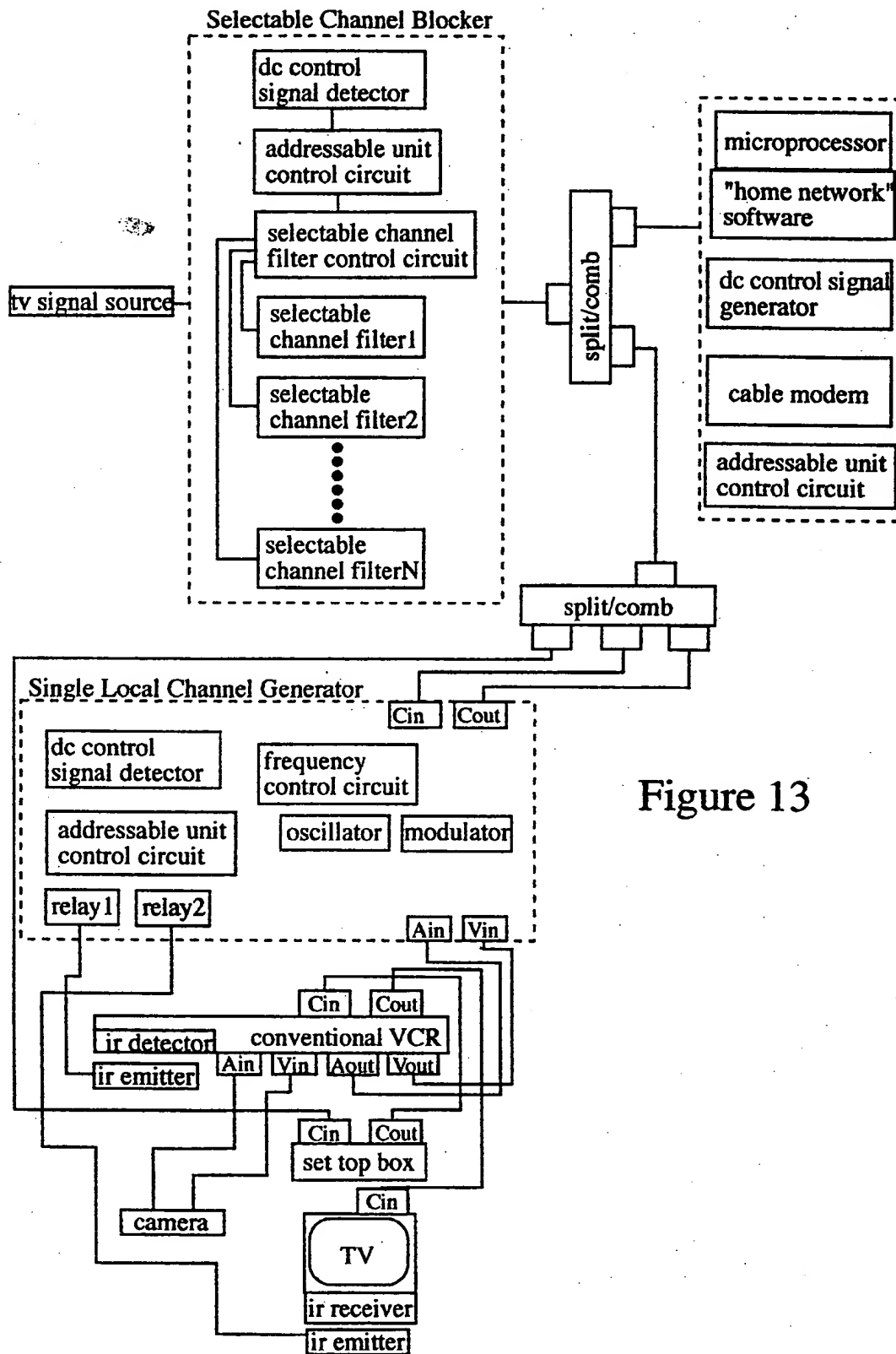


Figure 13

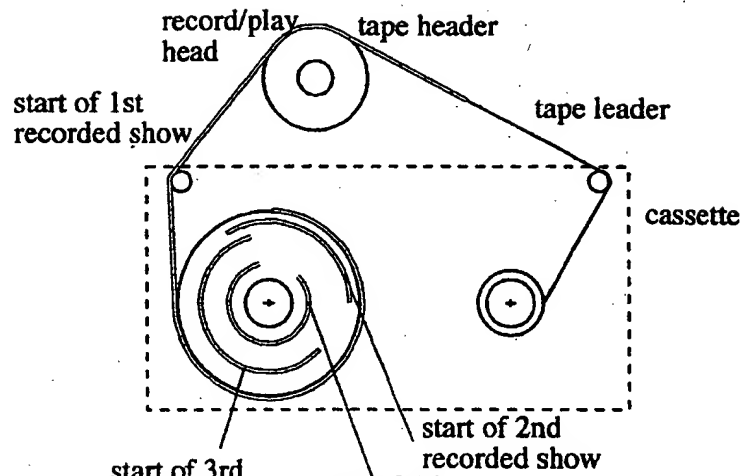


Figure 14(a)

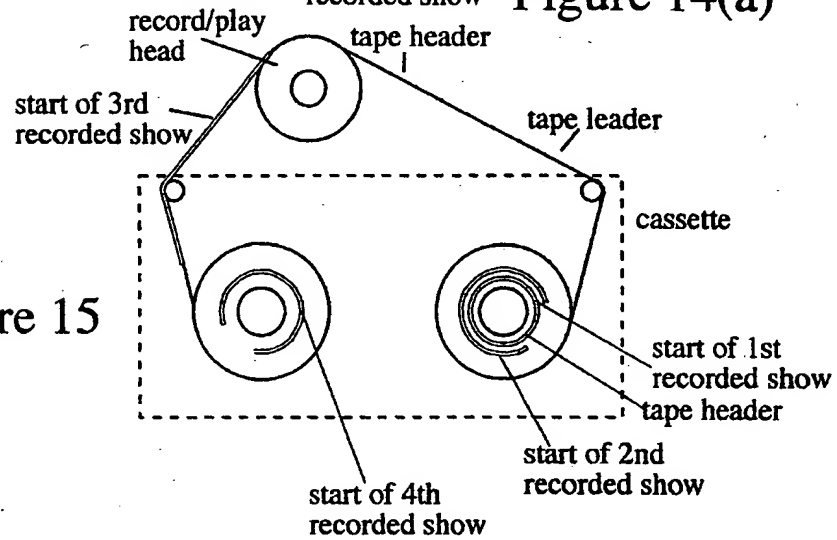


Figure 15

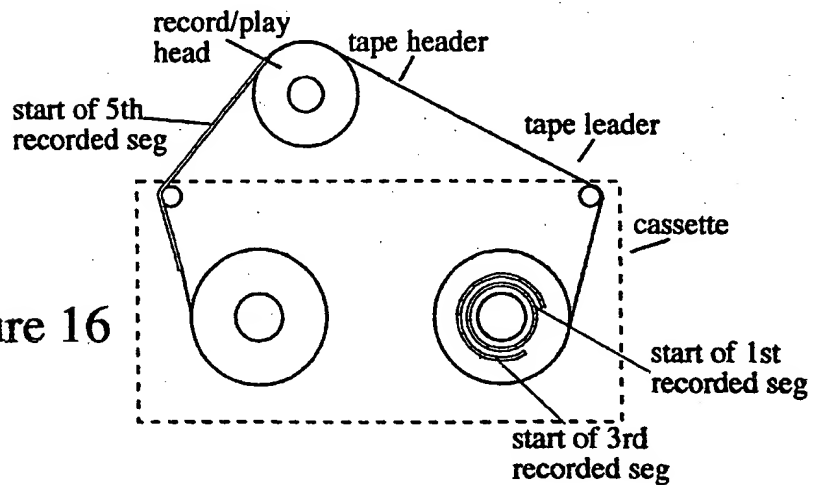


Figure 16

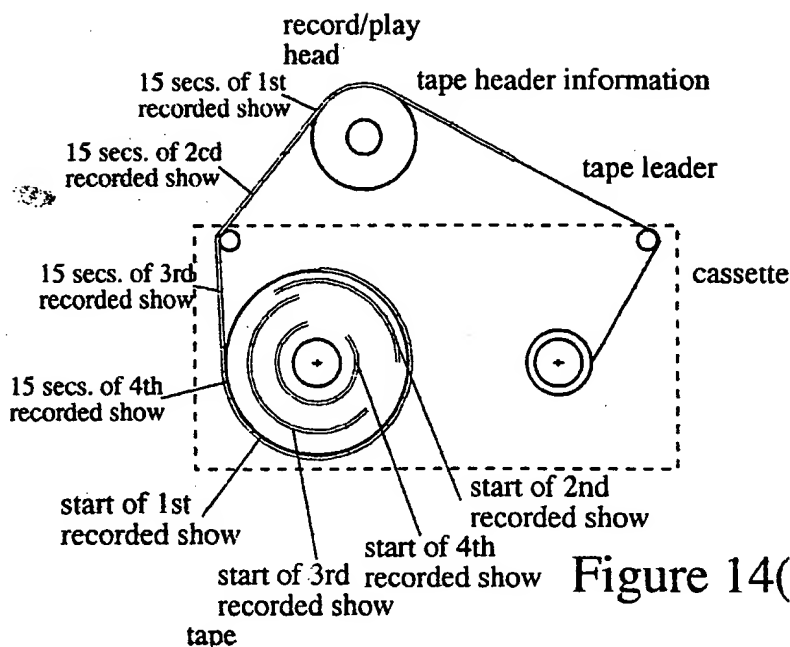


Figure 14(b)

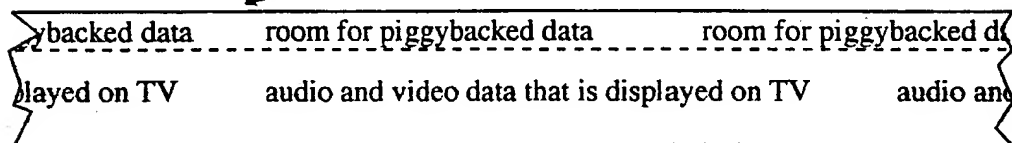


Figure 14(c)

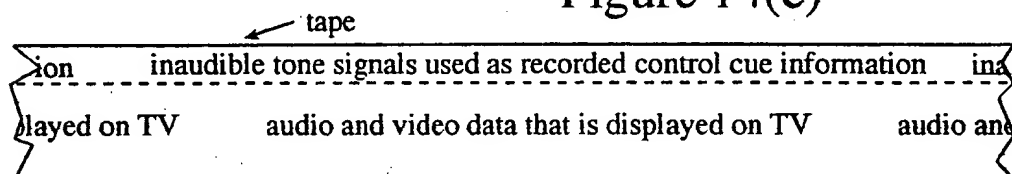


Figure 14(d)

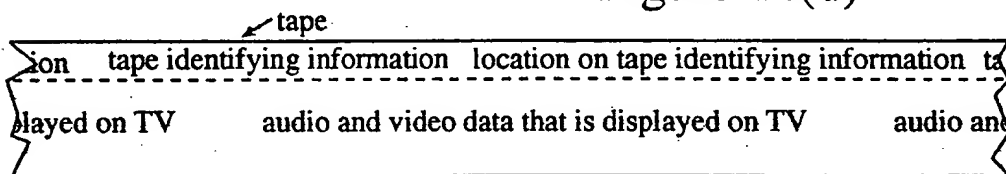


Figure 14(e)

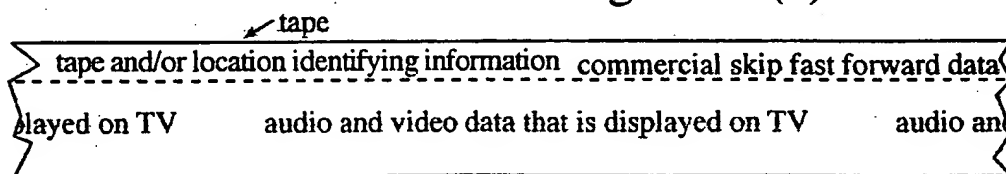


Figure 14(f)

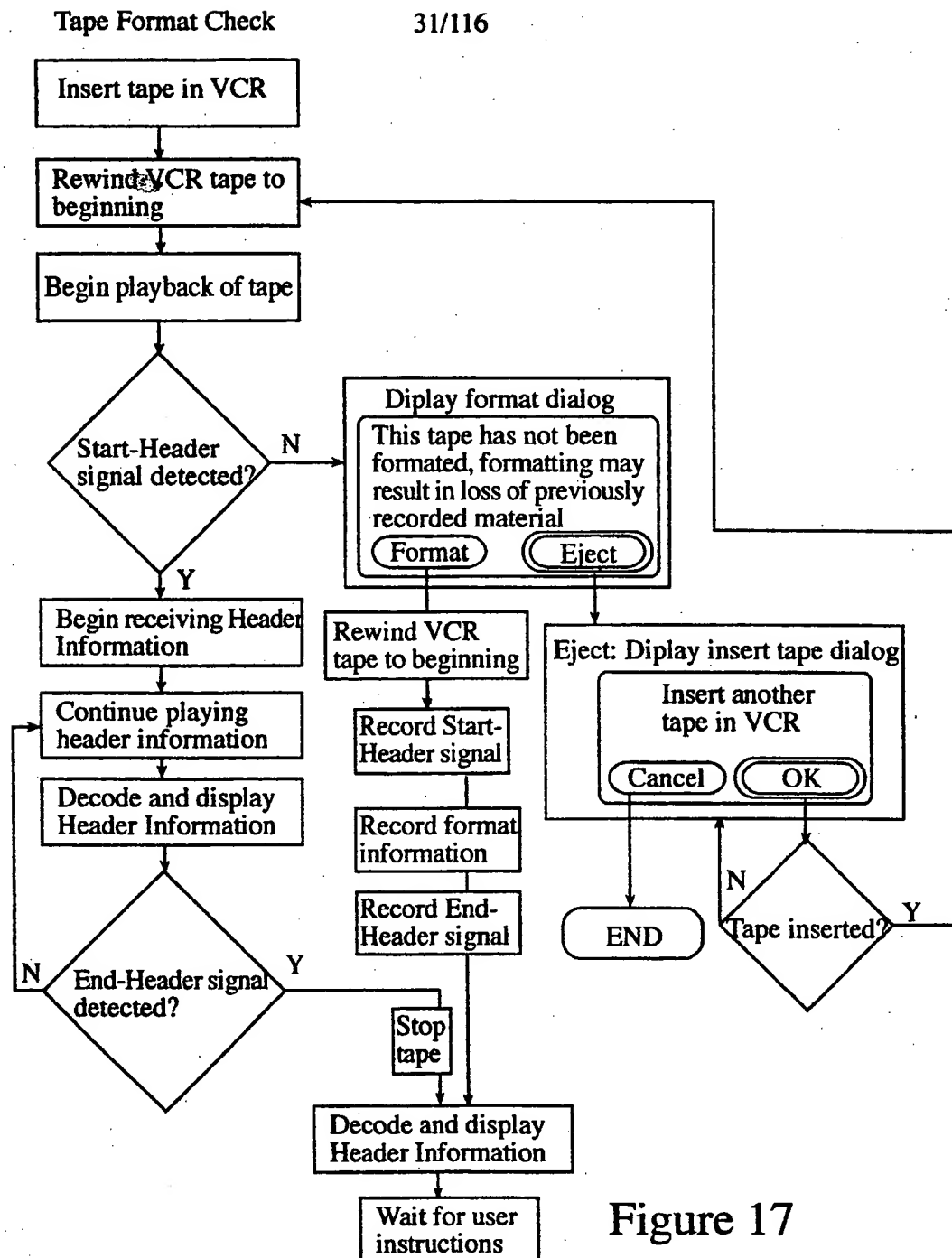
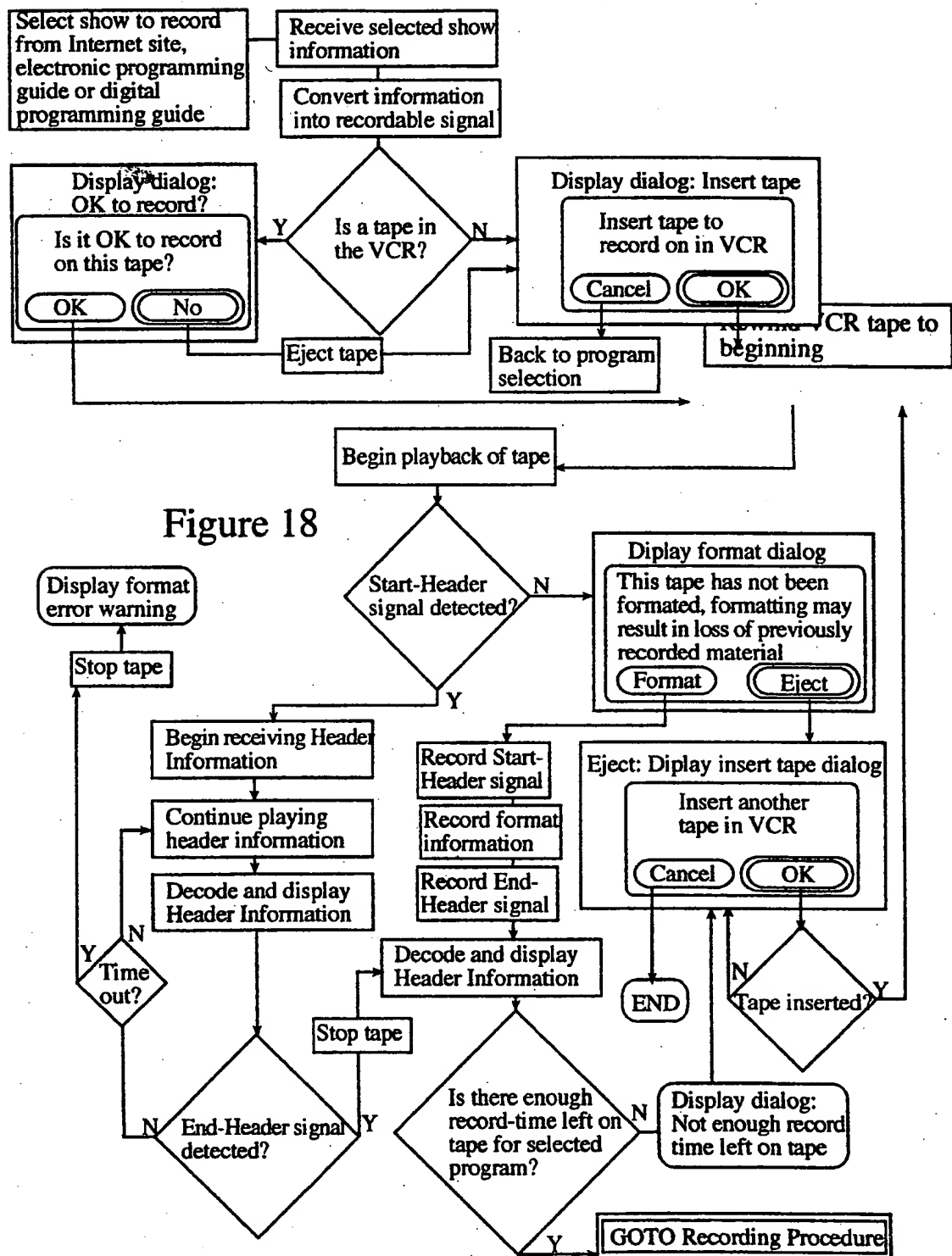


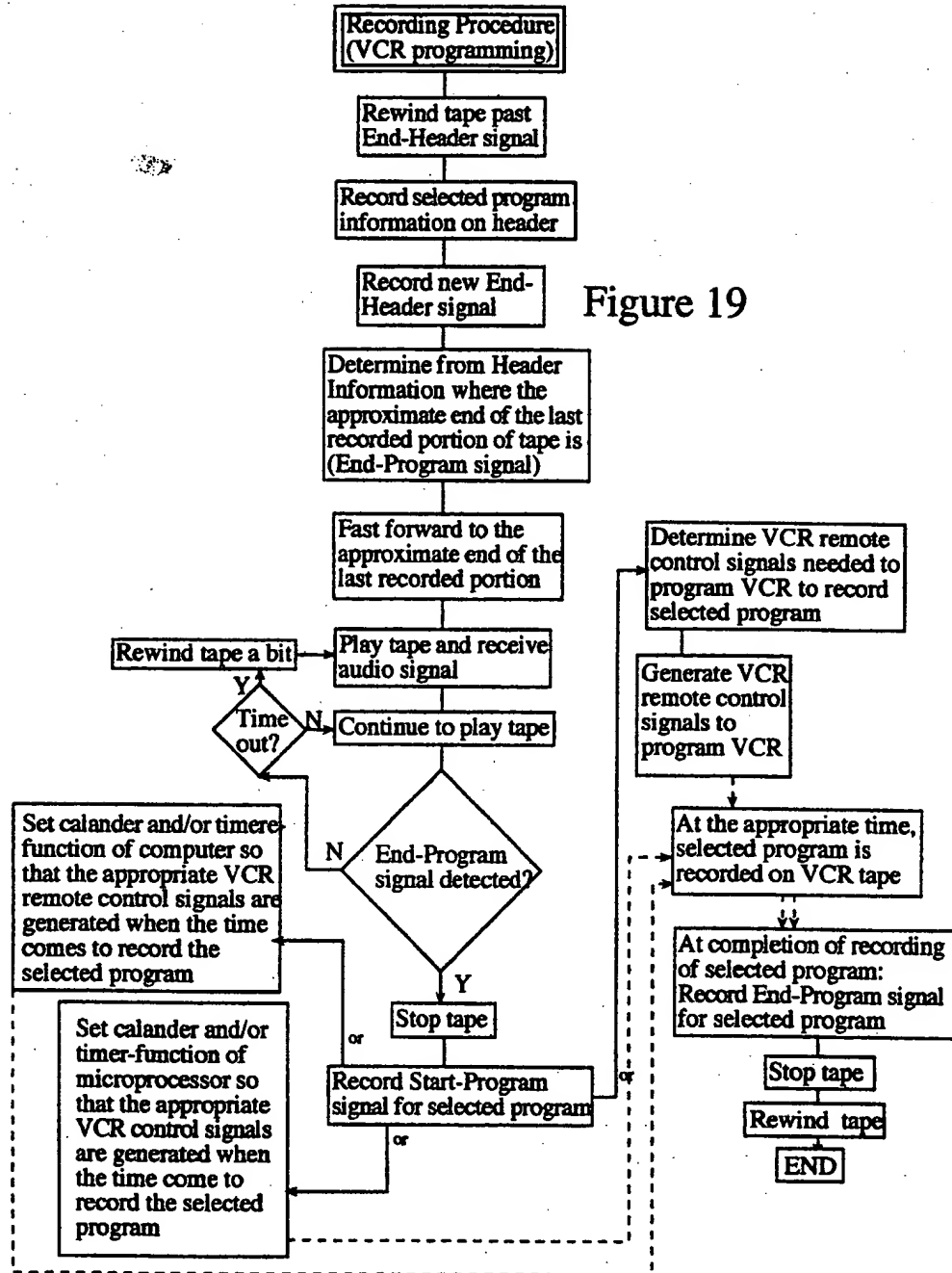
Figure 17

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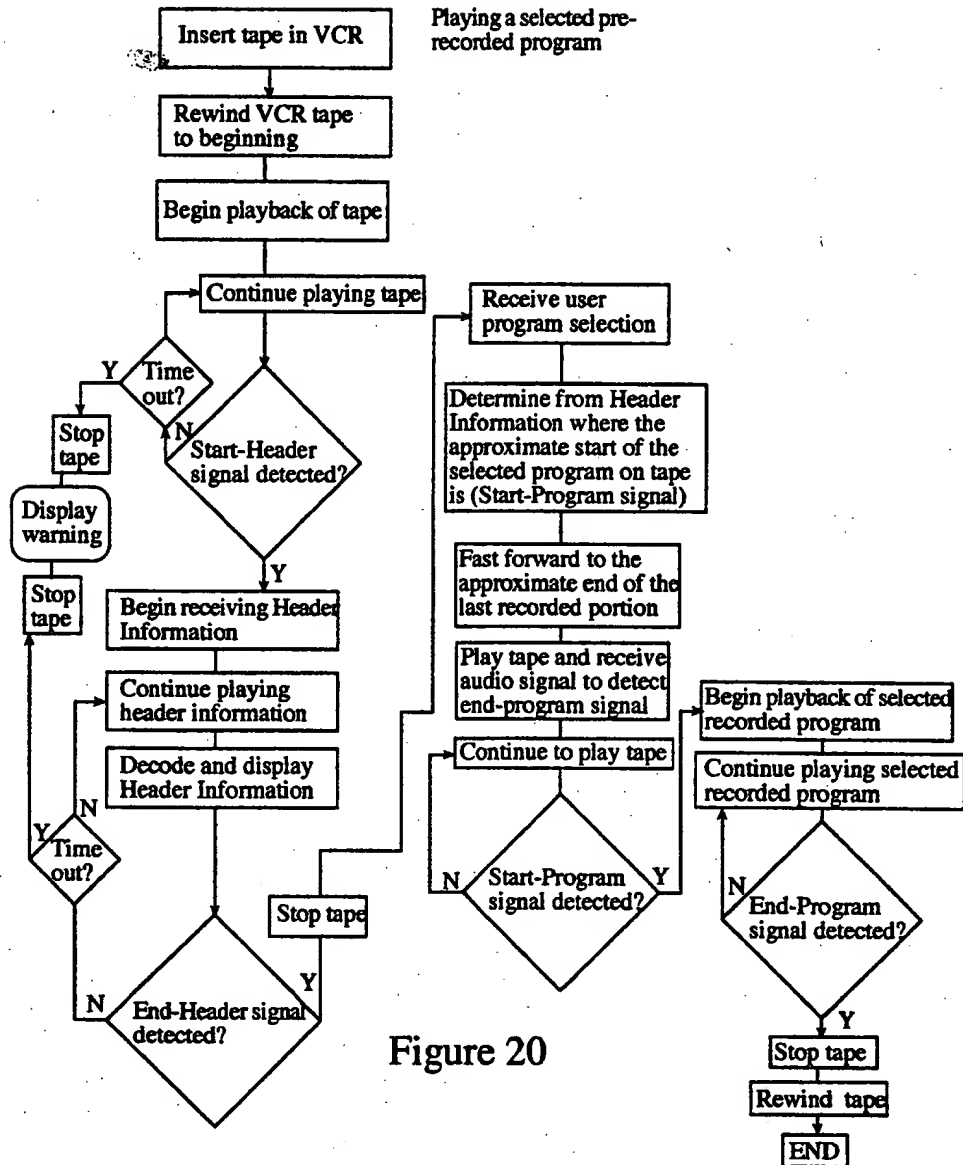


Figure 20

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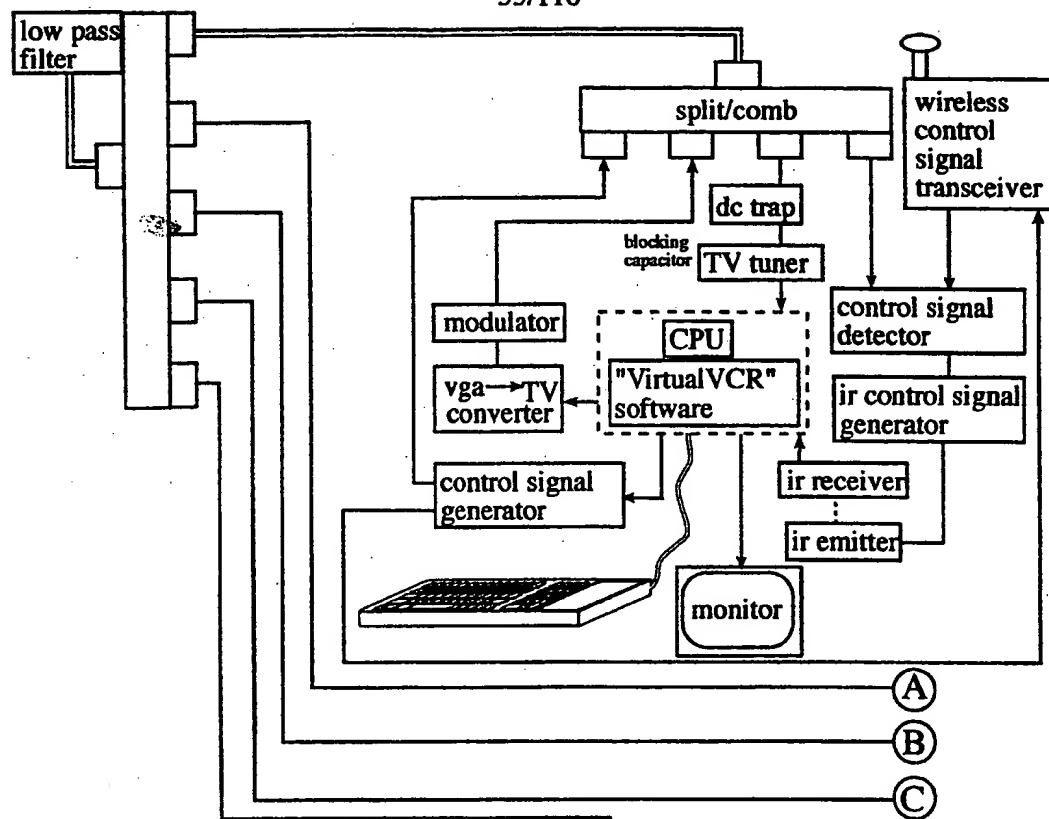
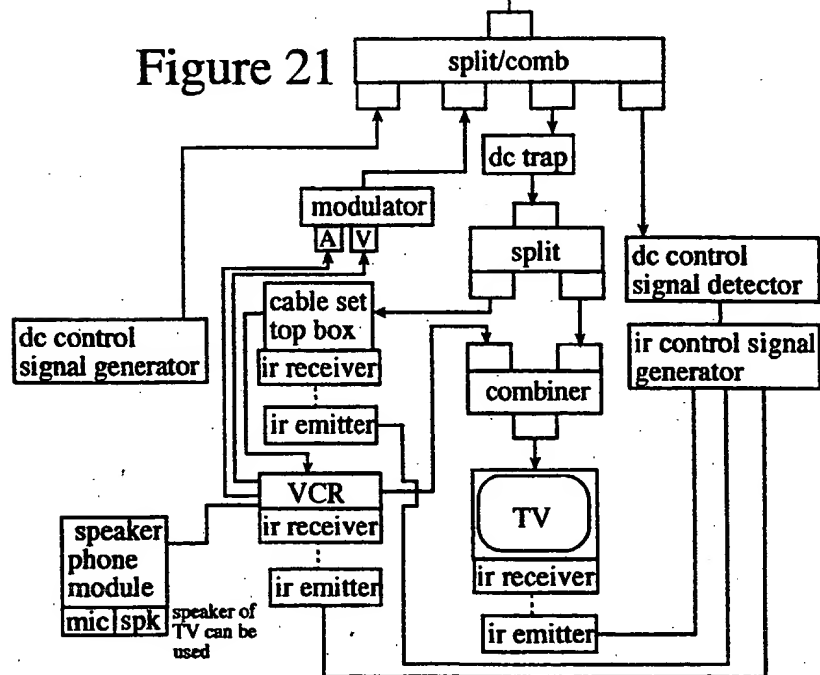
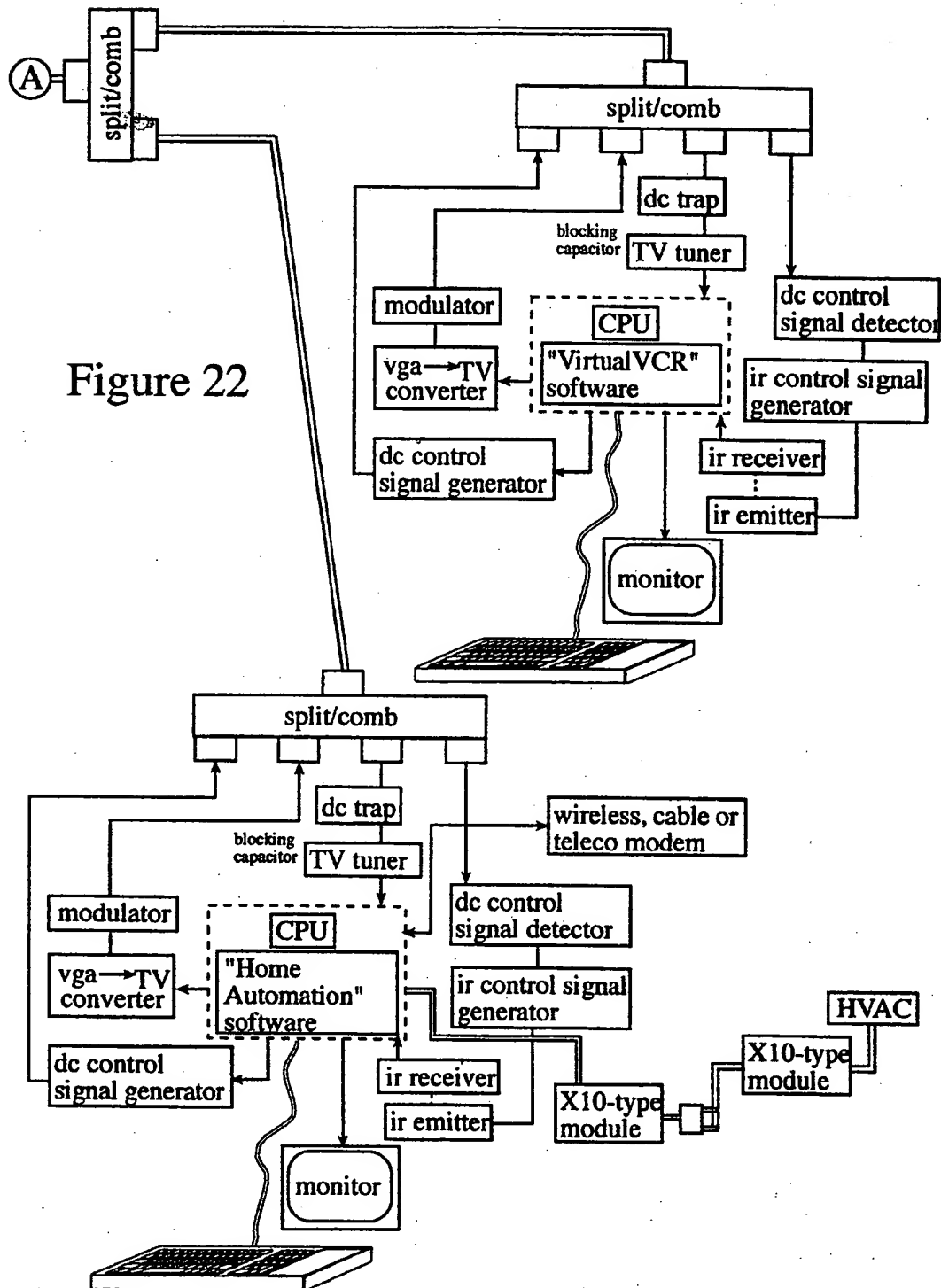


Figure 21



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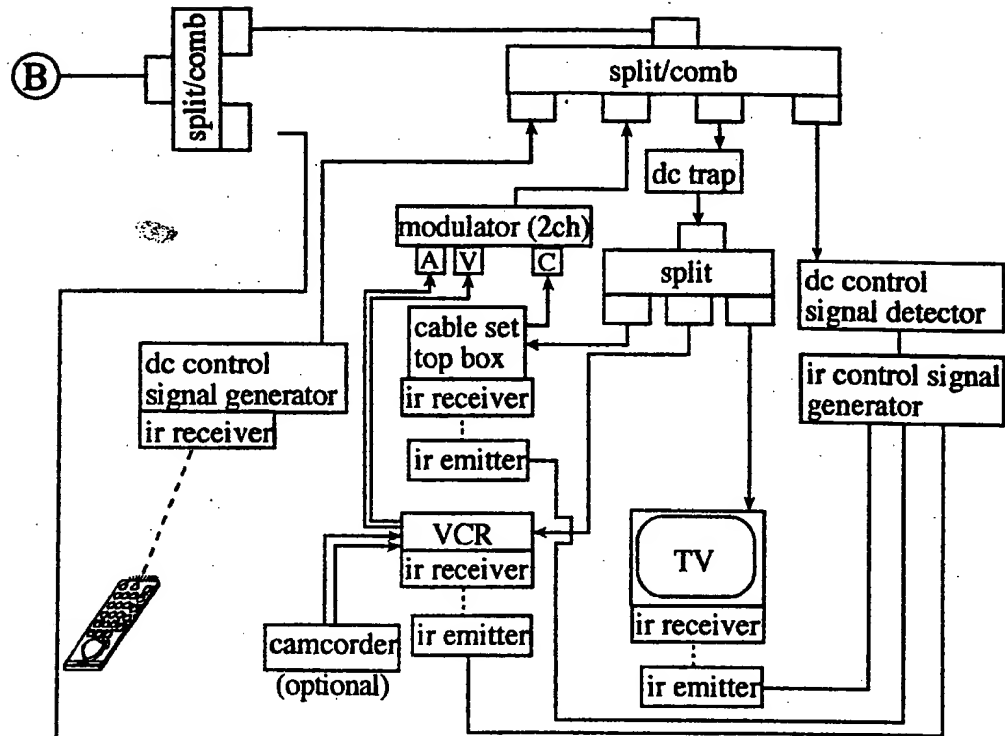
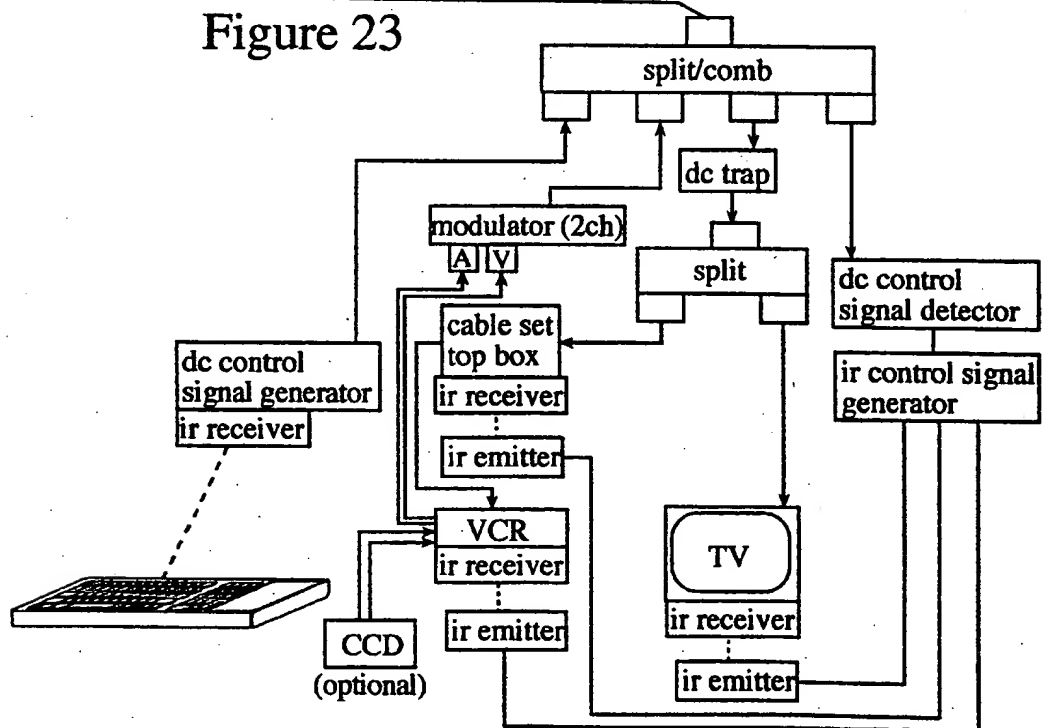
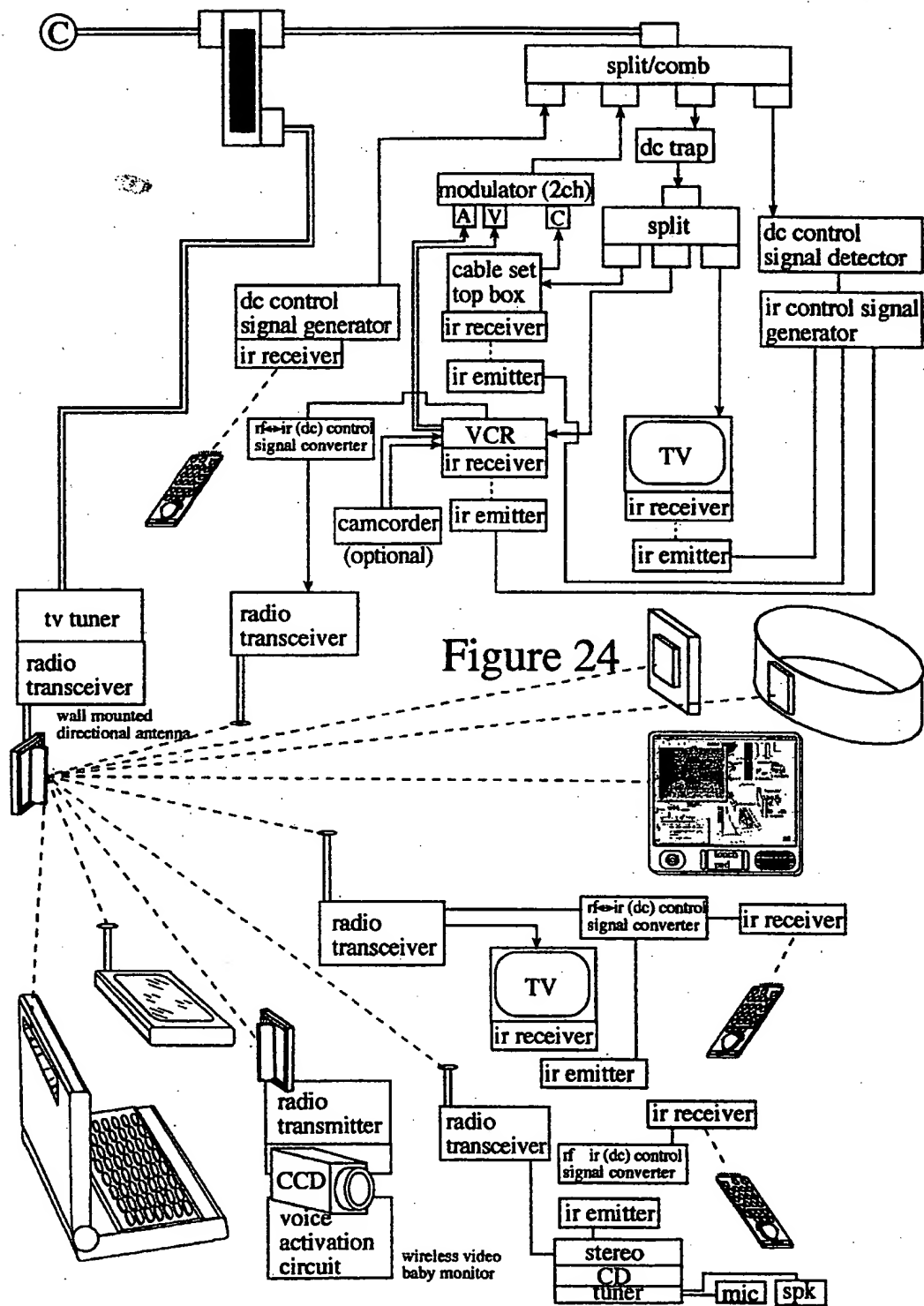
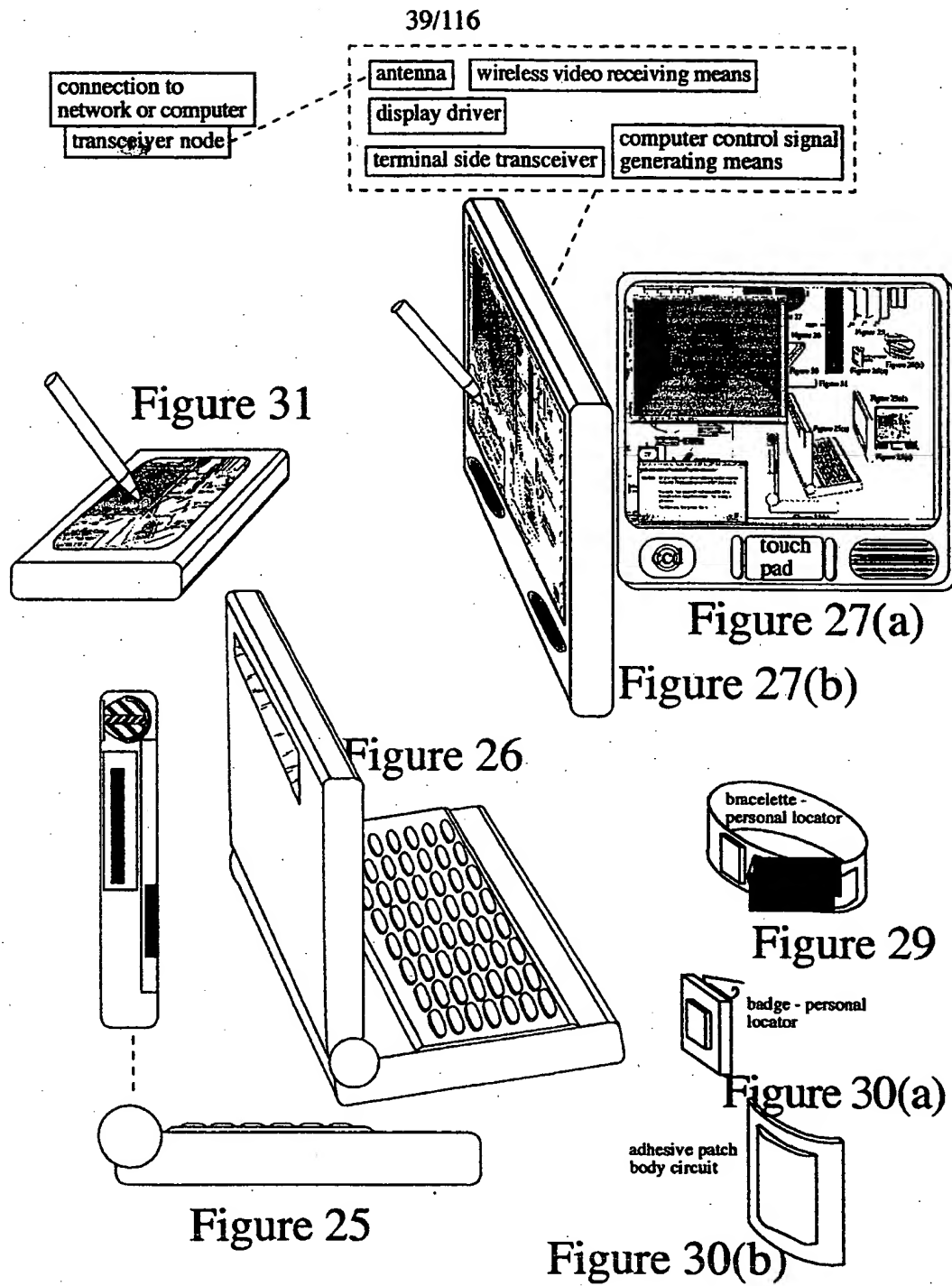


Figure 23



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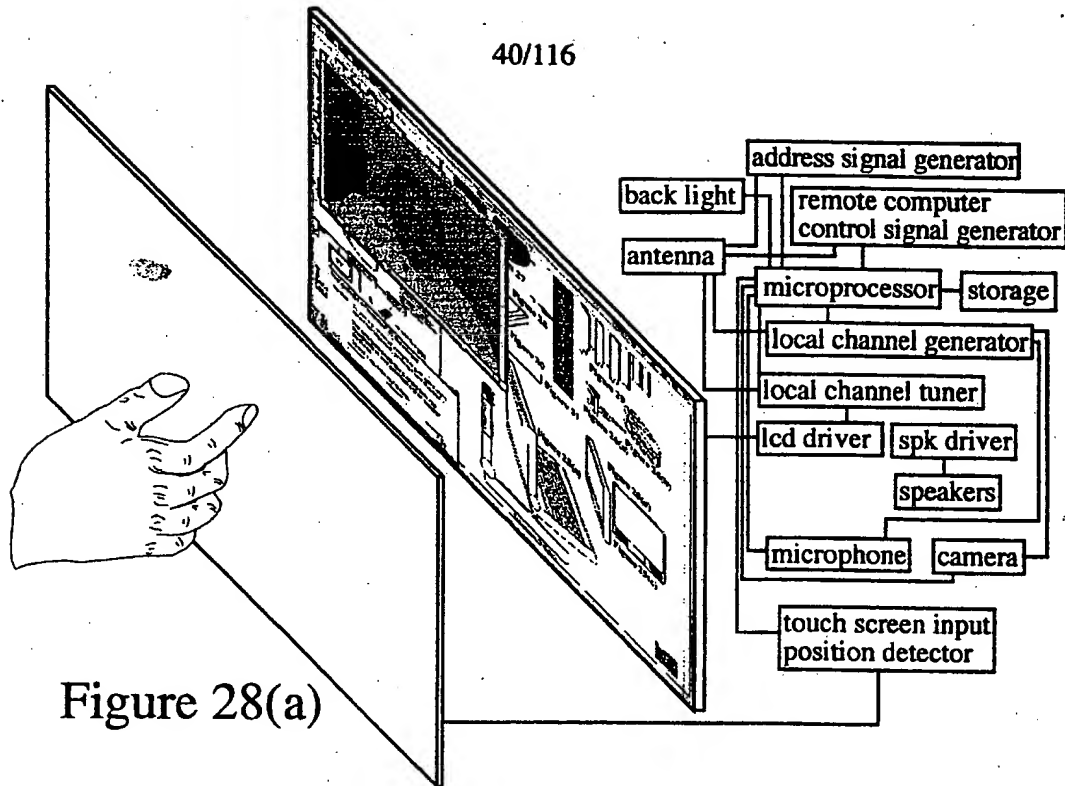


Figure 28(a)

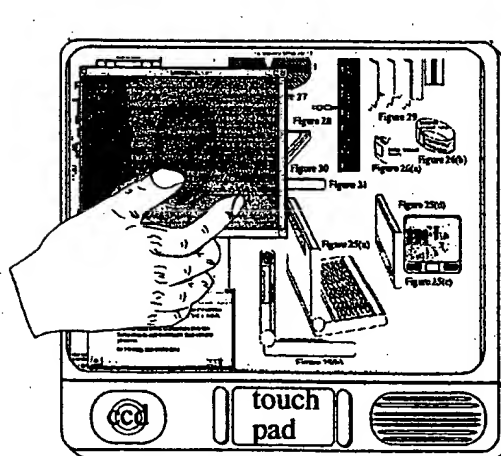


Figure 28(b)

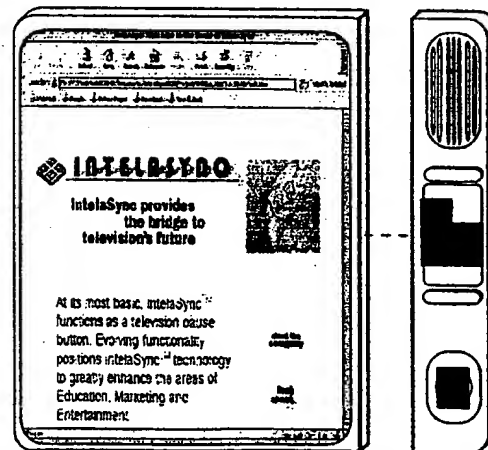


Figure 28(c)



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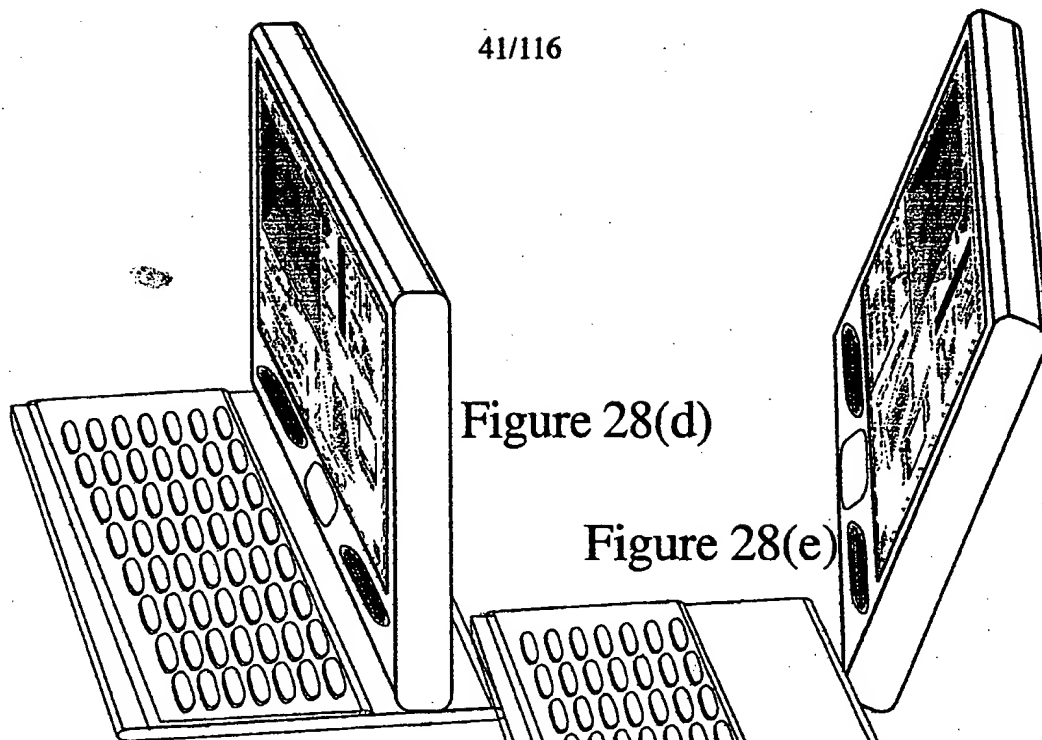


Figure 28(d)

Figure 28(e)

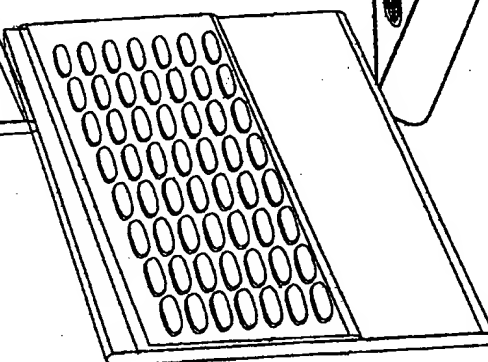


Figure 28(h)

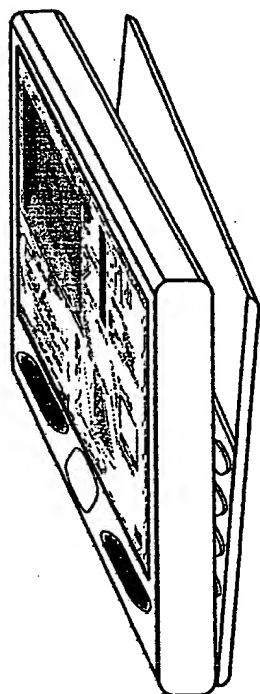


Figure 28(f)

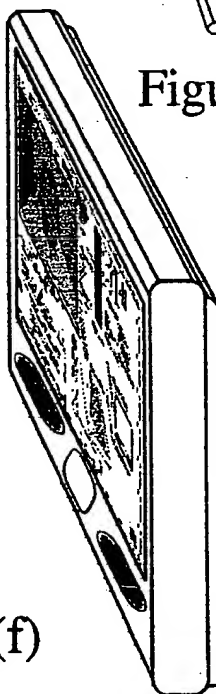
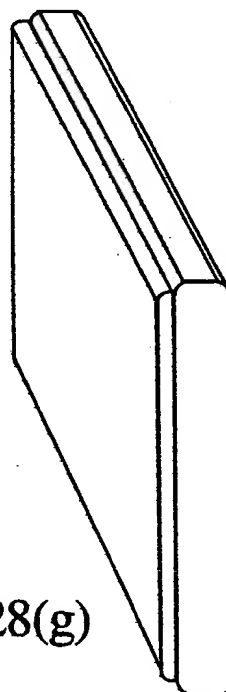


Figure 28(g)



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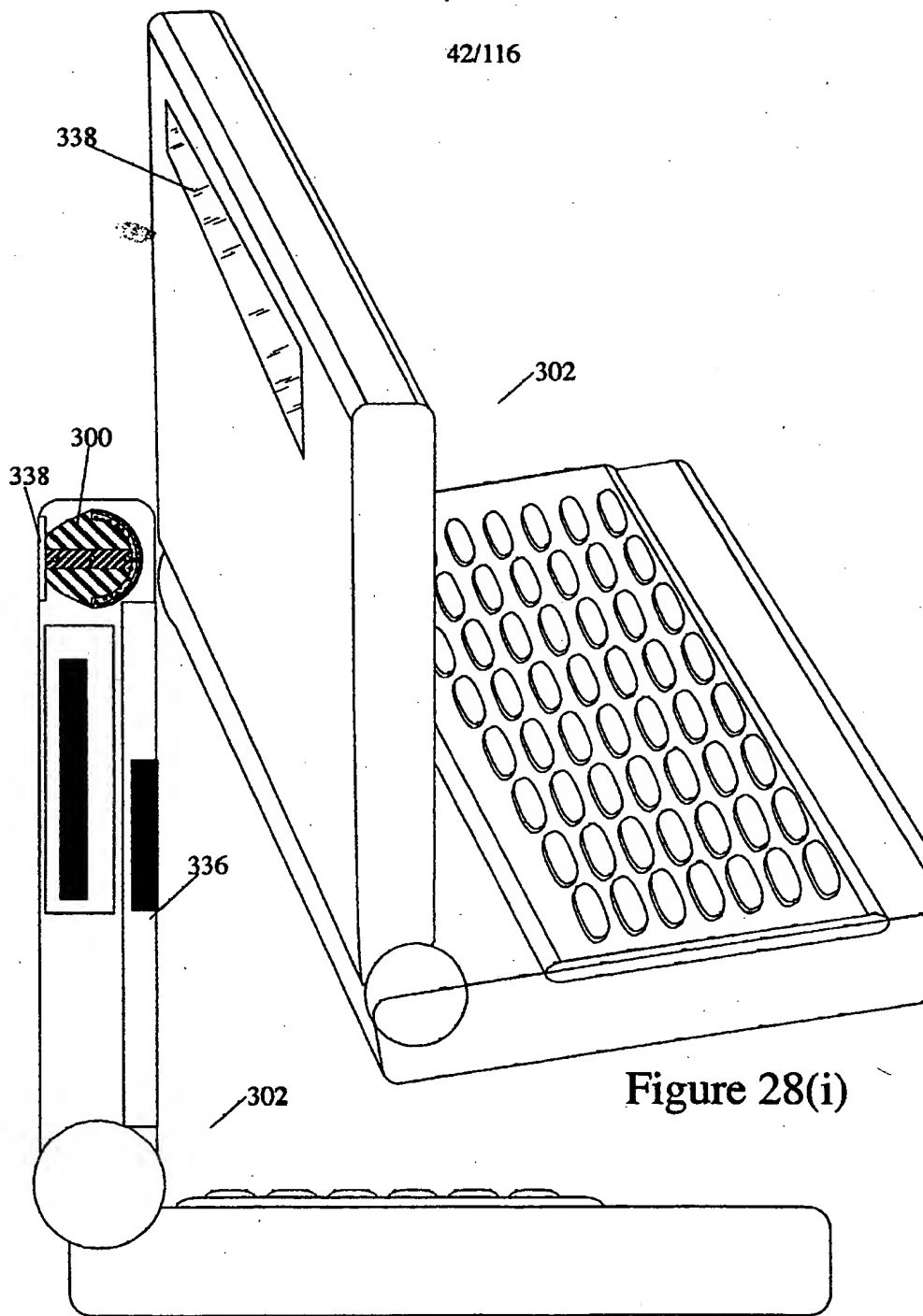
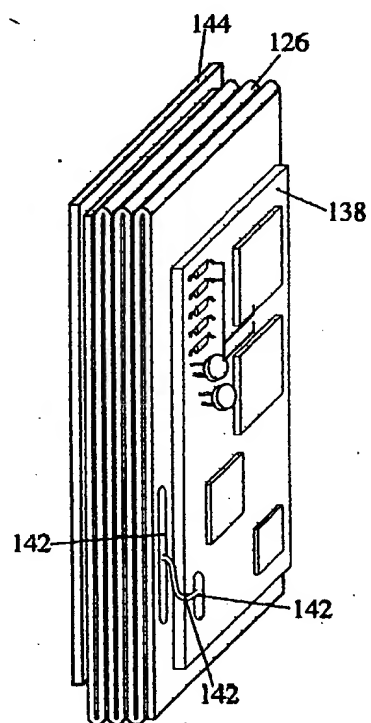
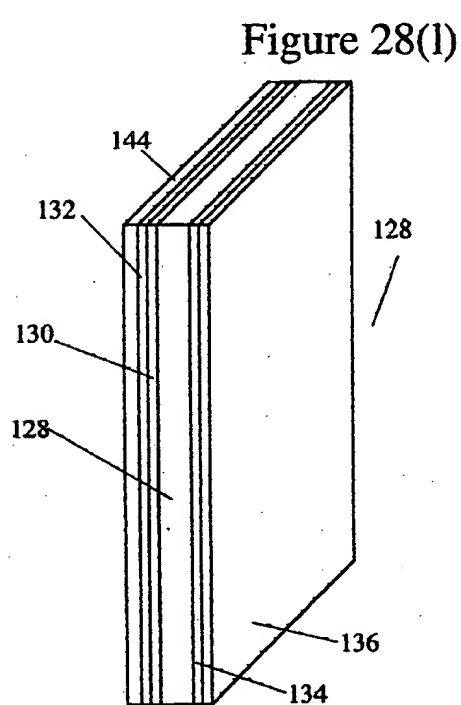
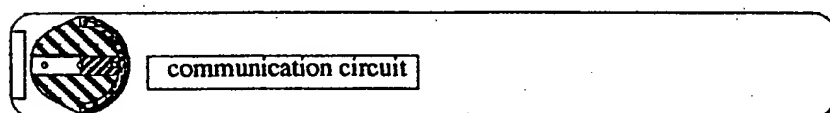
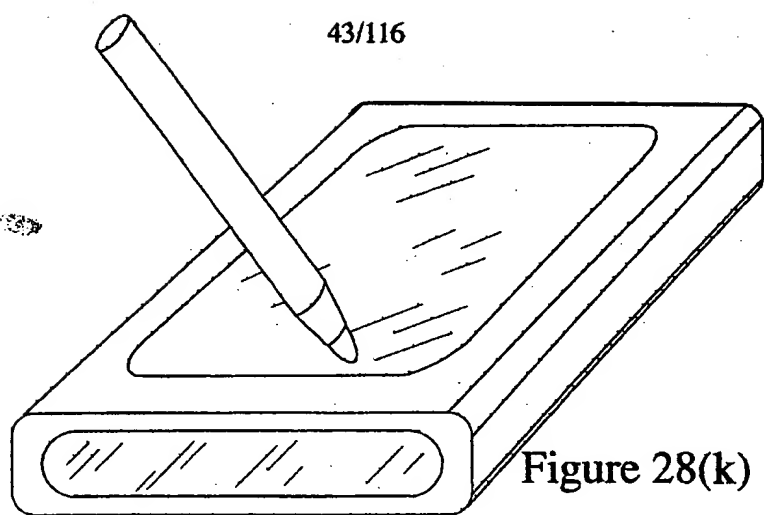
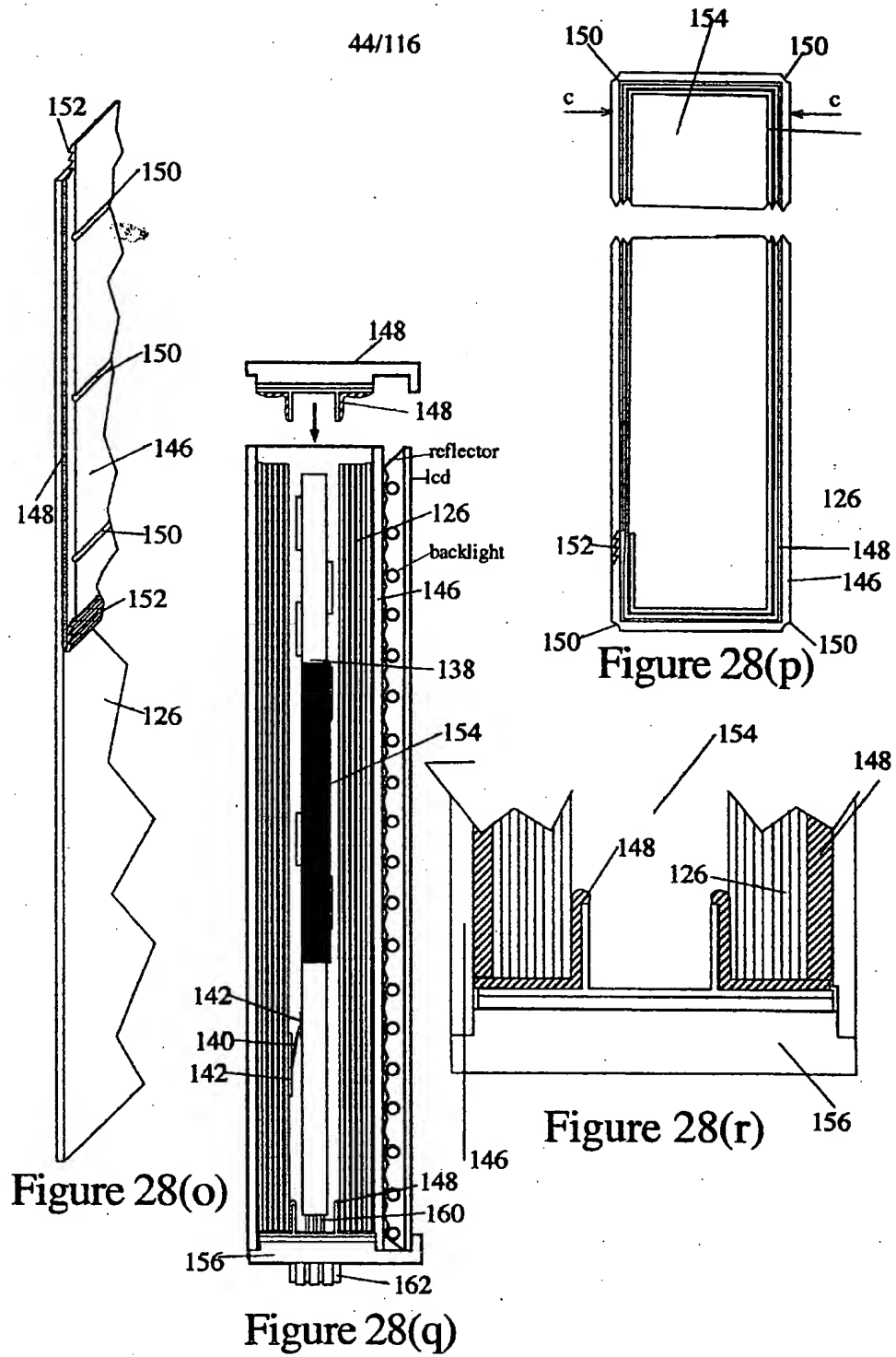


Figure 28(i)

Figure 28(j)





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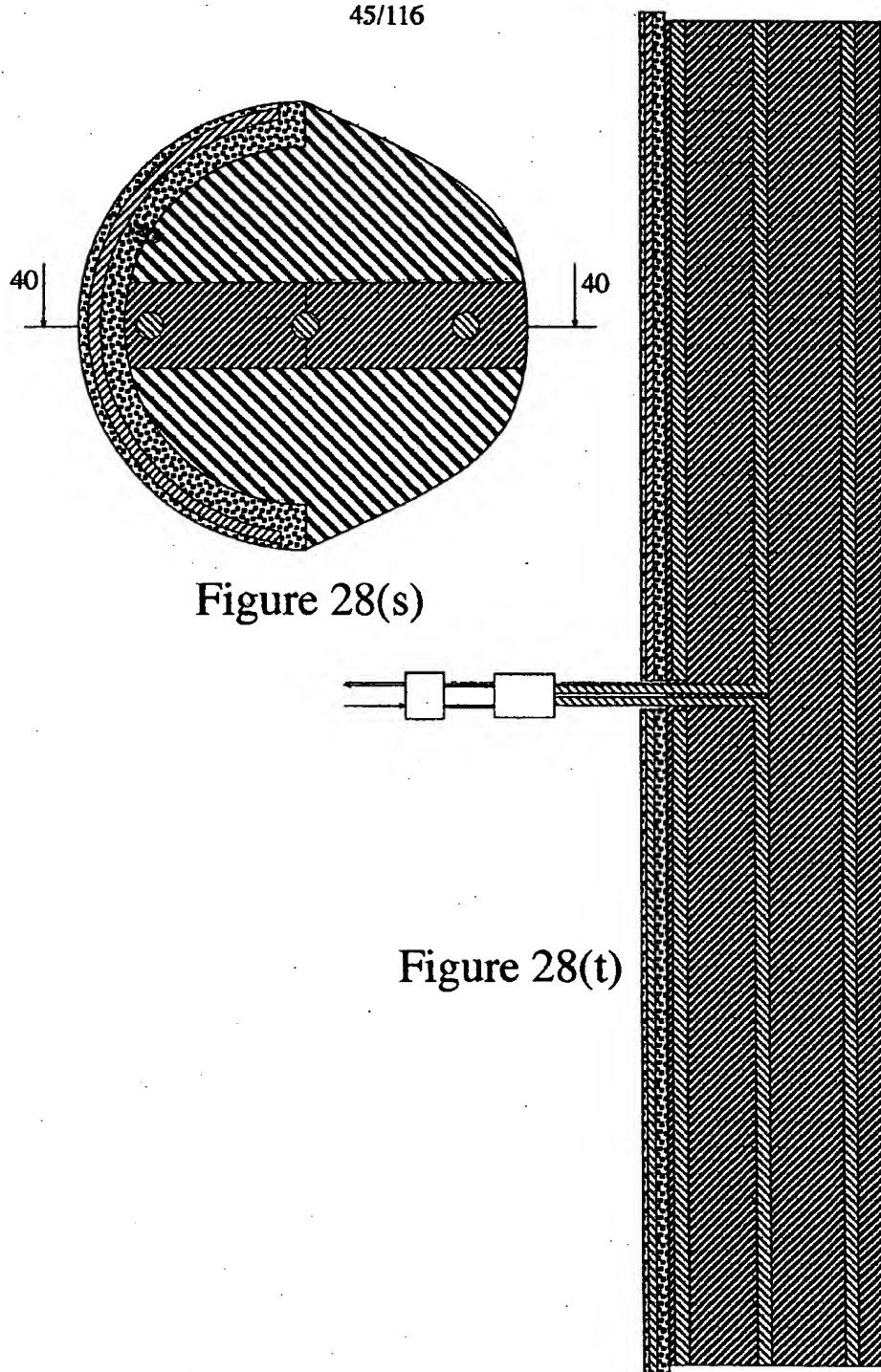


Figure 28(s)

Figure 28(t)

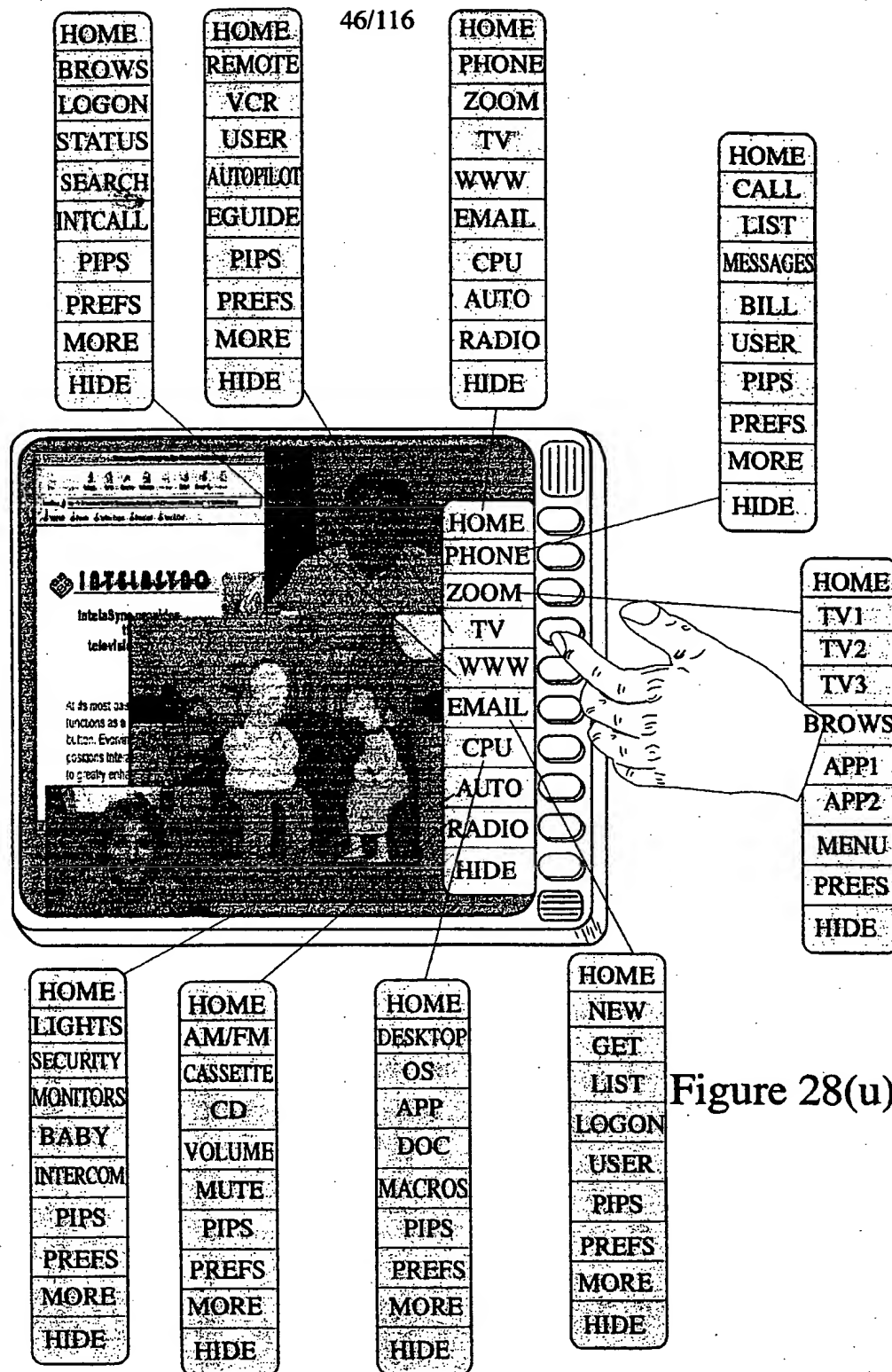


Figure 28(u)

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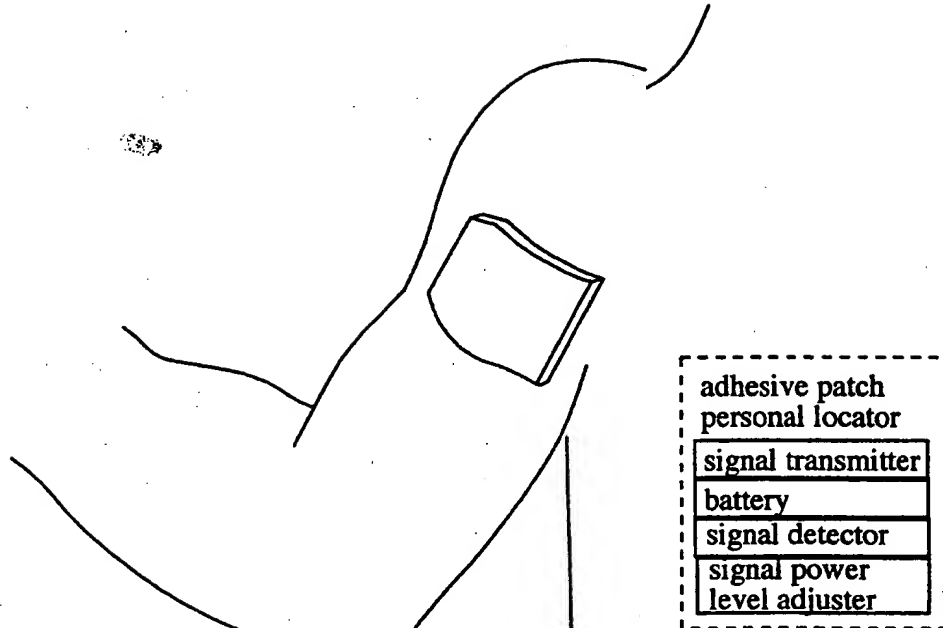


Figure 30(c)

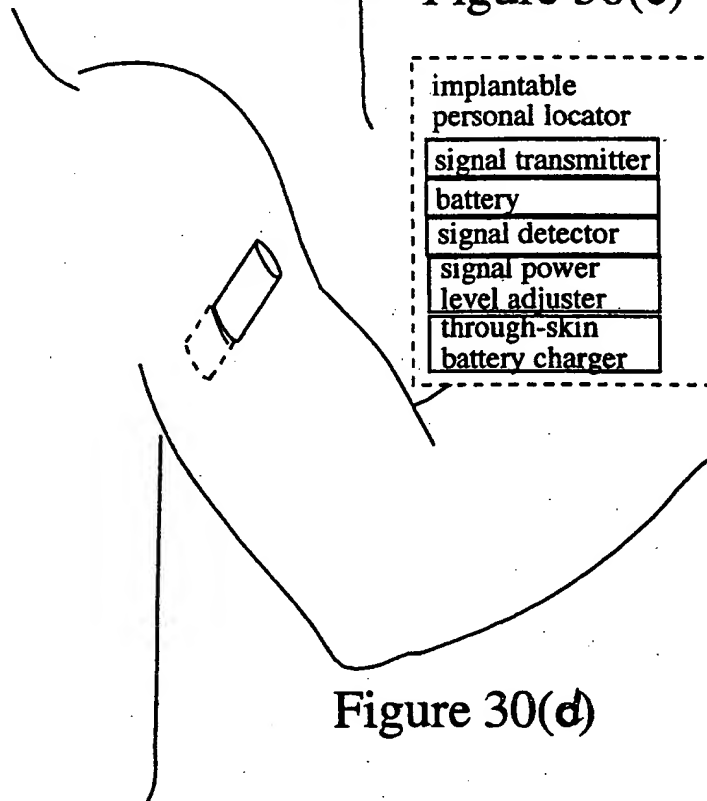


Figure 30(d)

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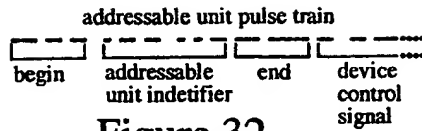


Figure 32

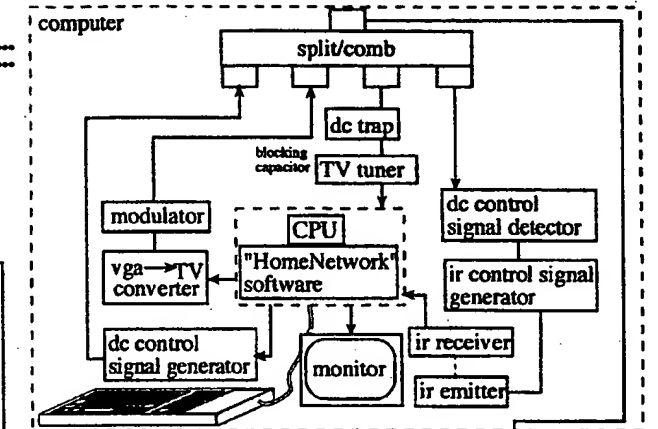
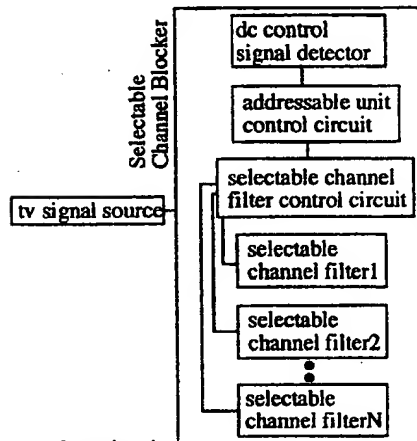
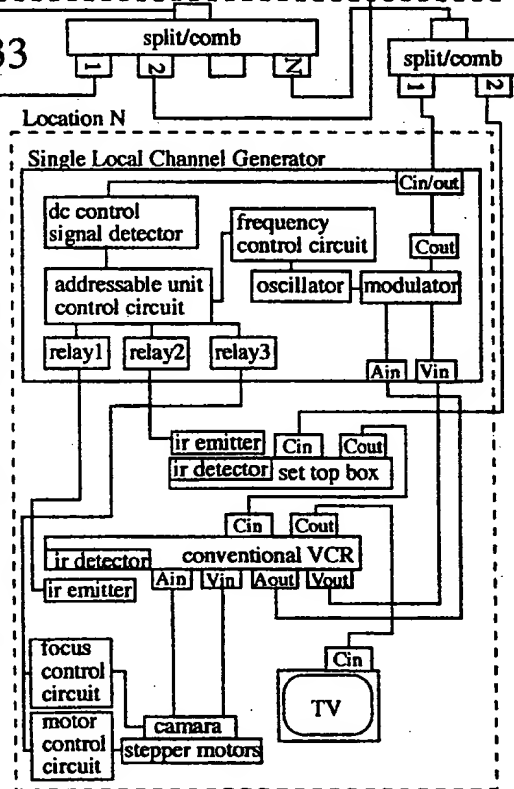
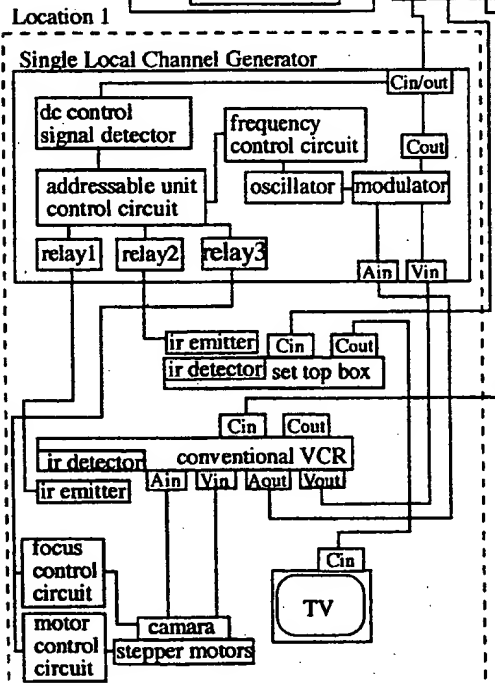
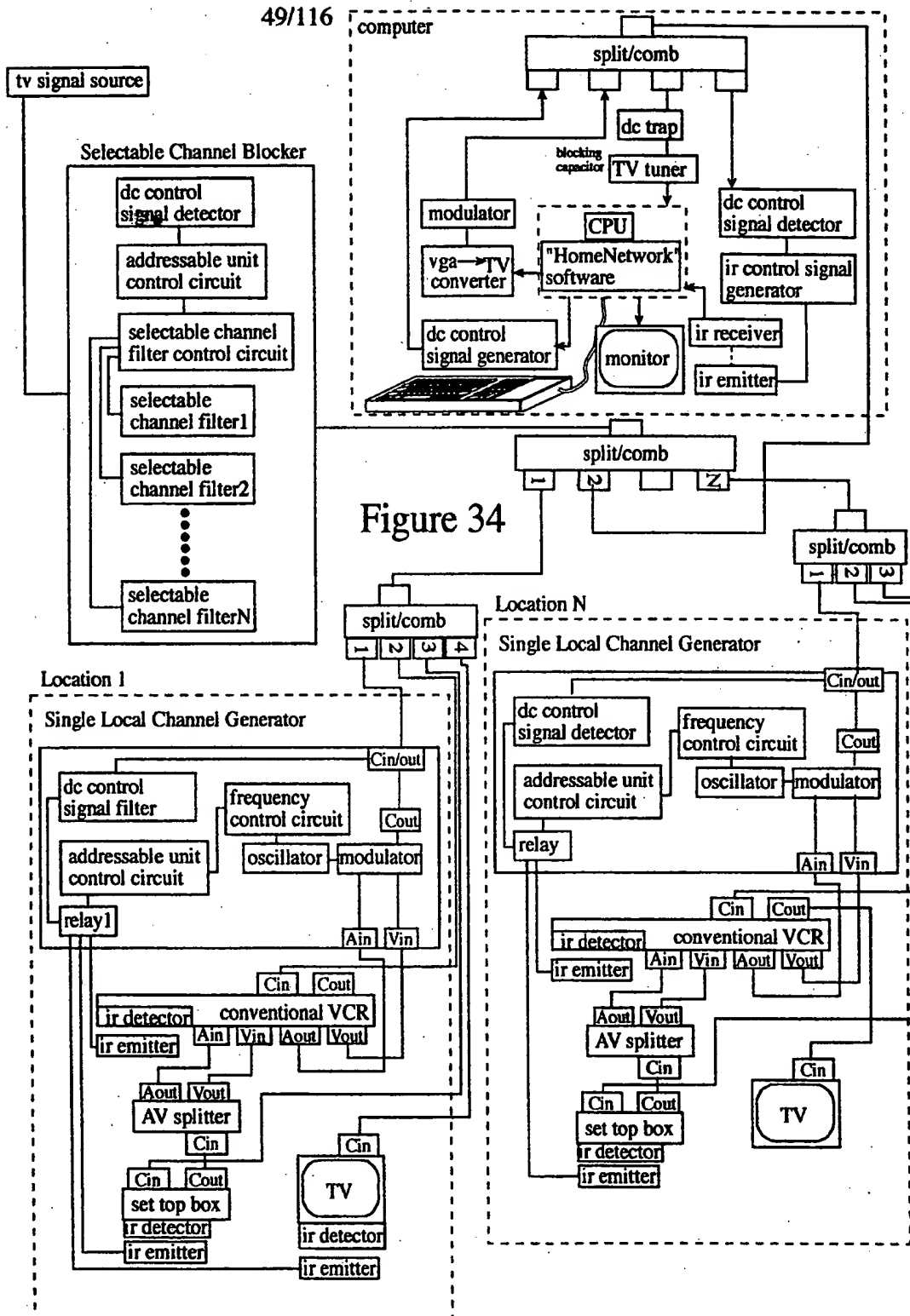


Figure 33

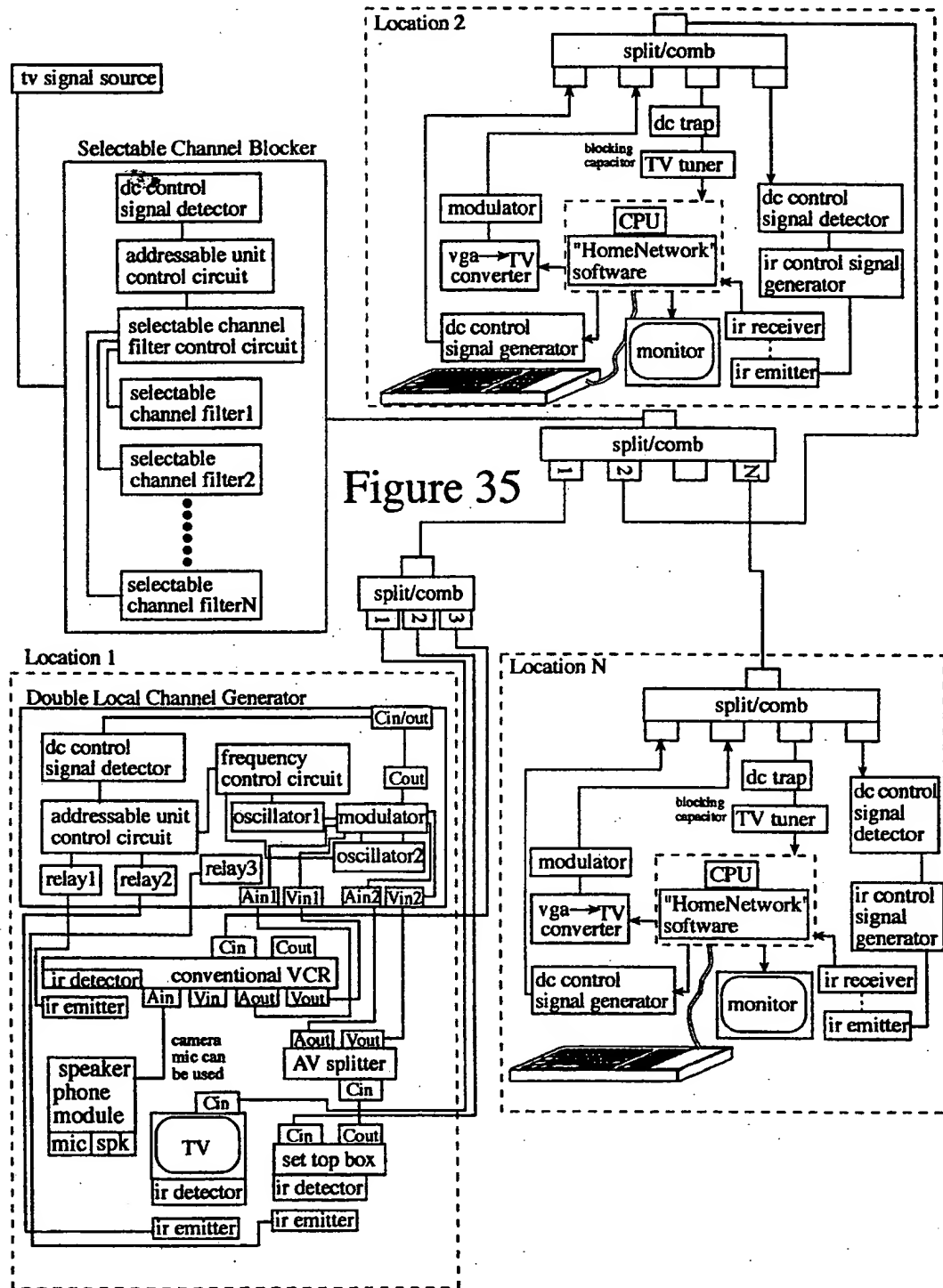




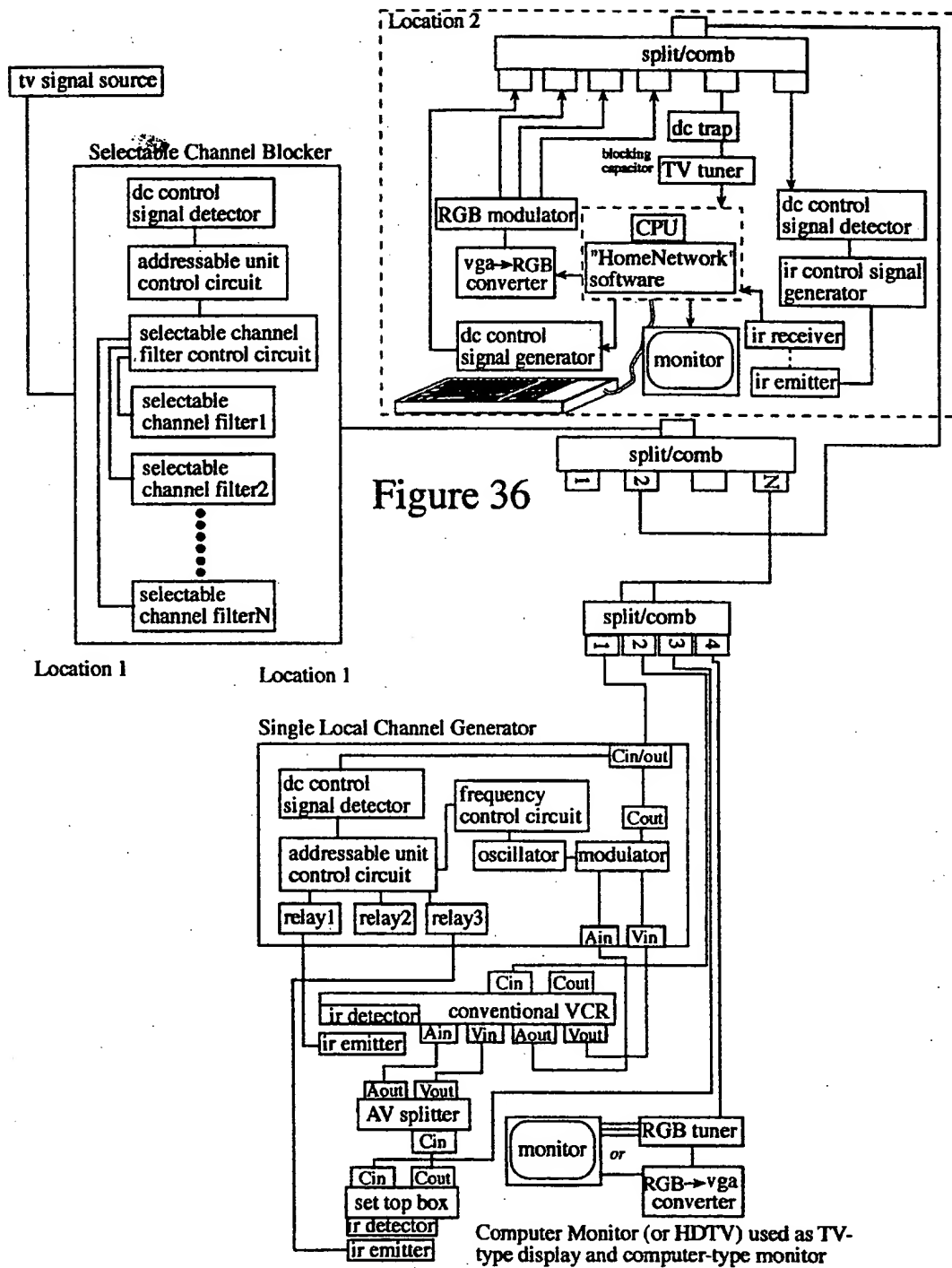
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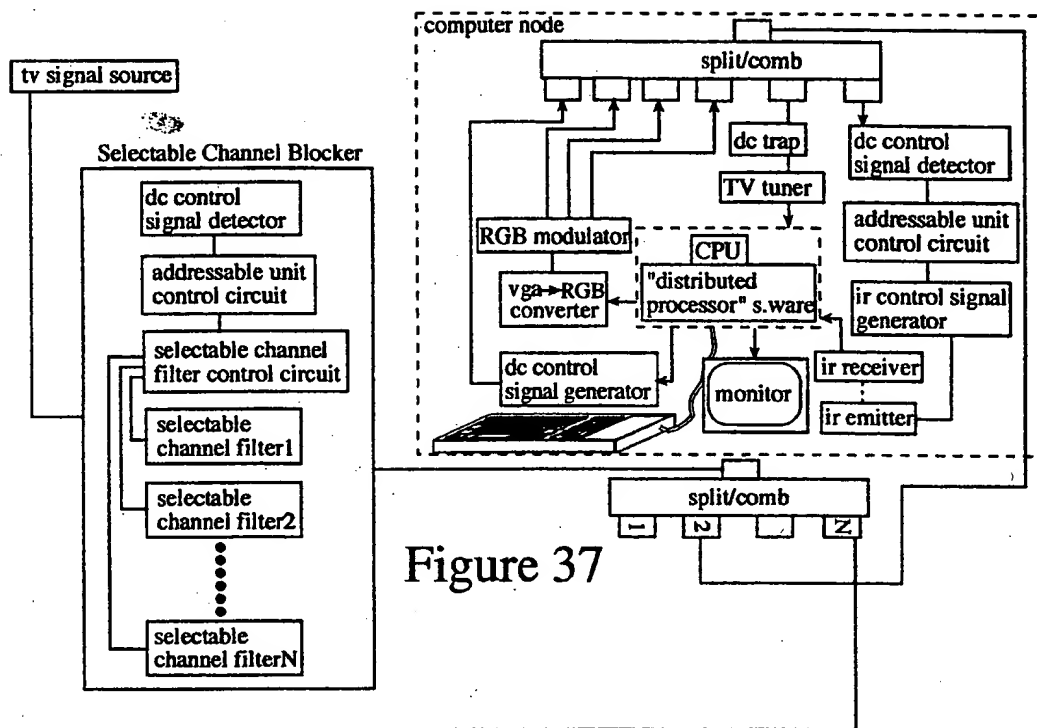
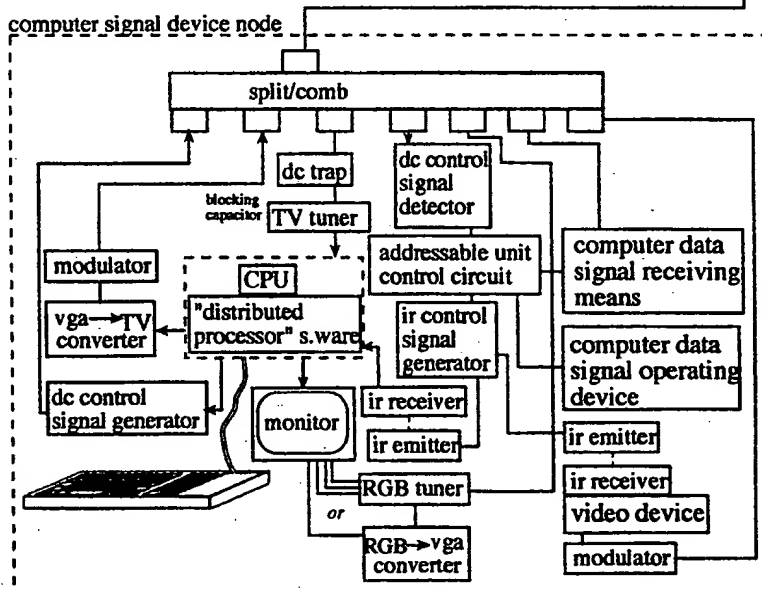


Figure 37



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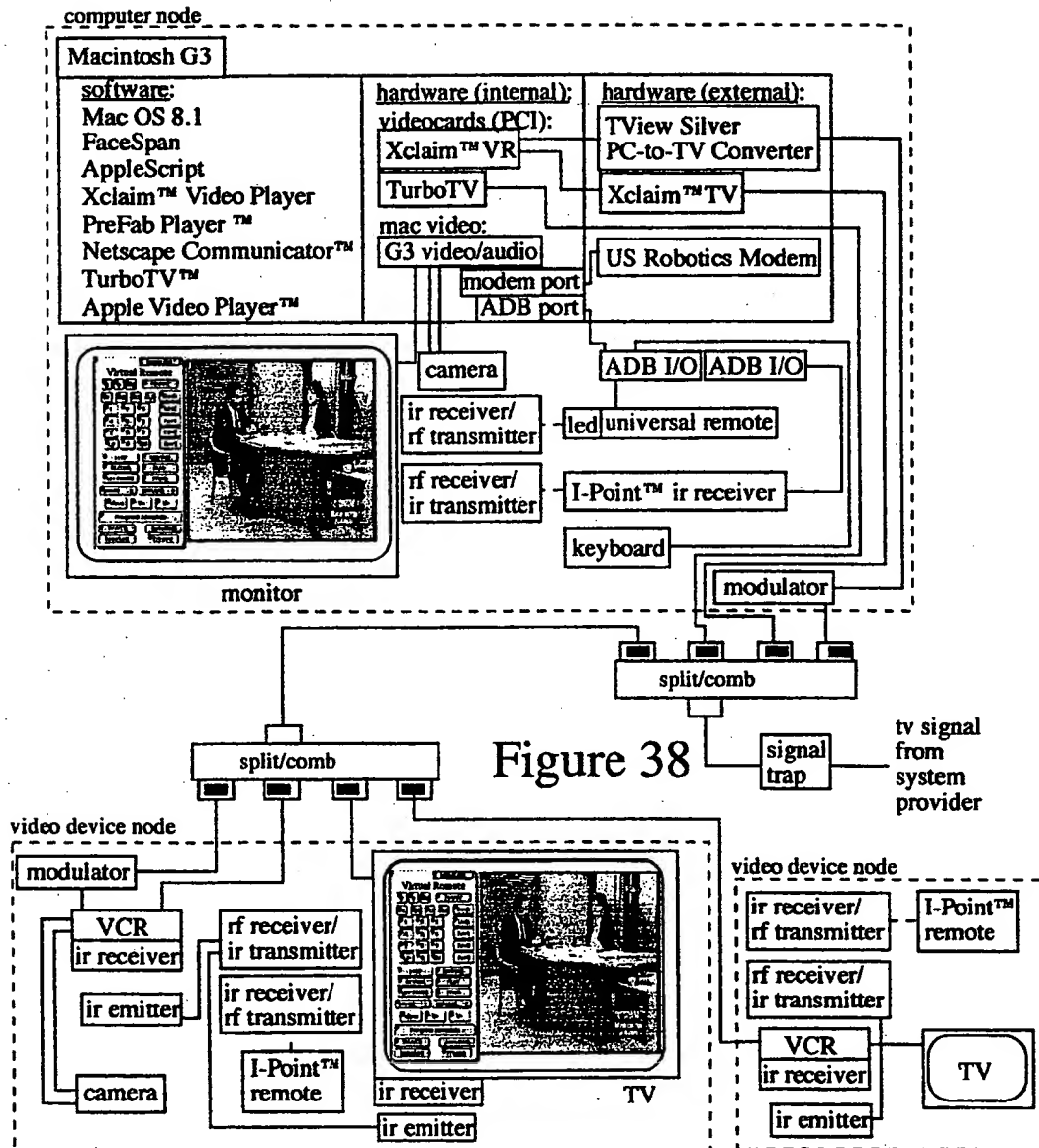


Figure 38

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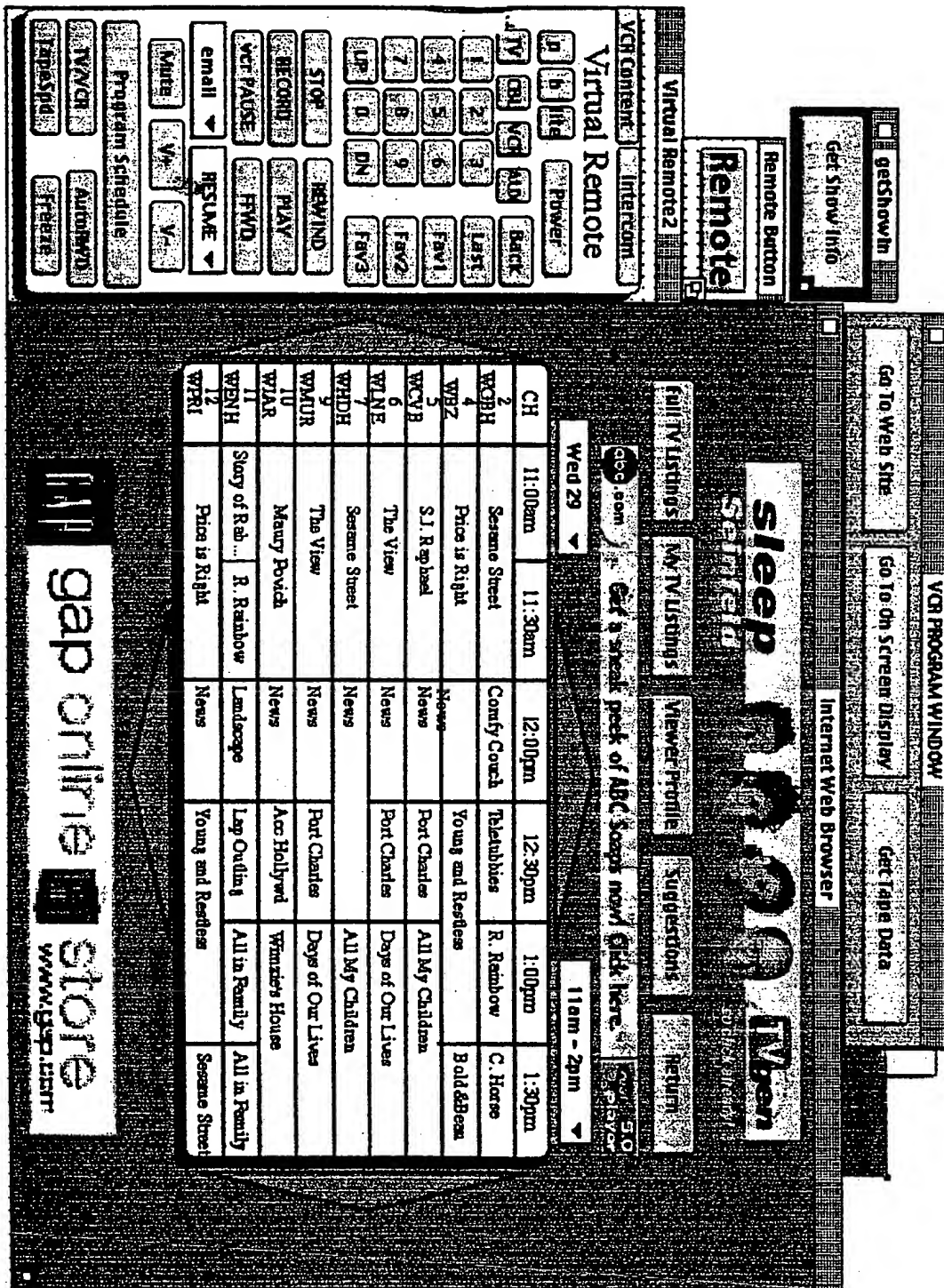


Figure 39

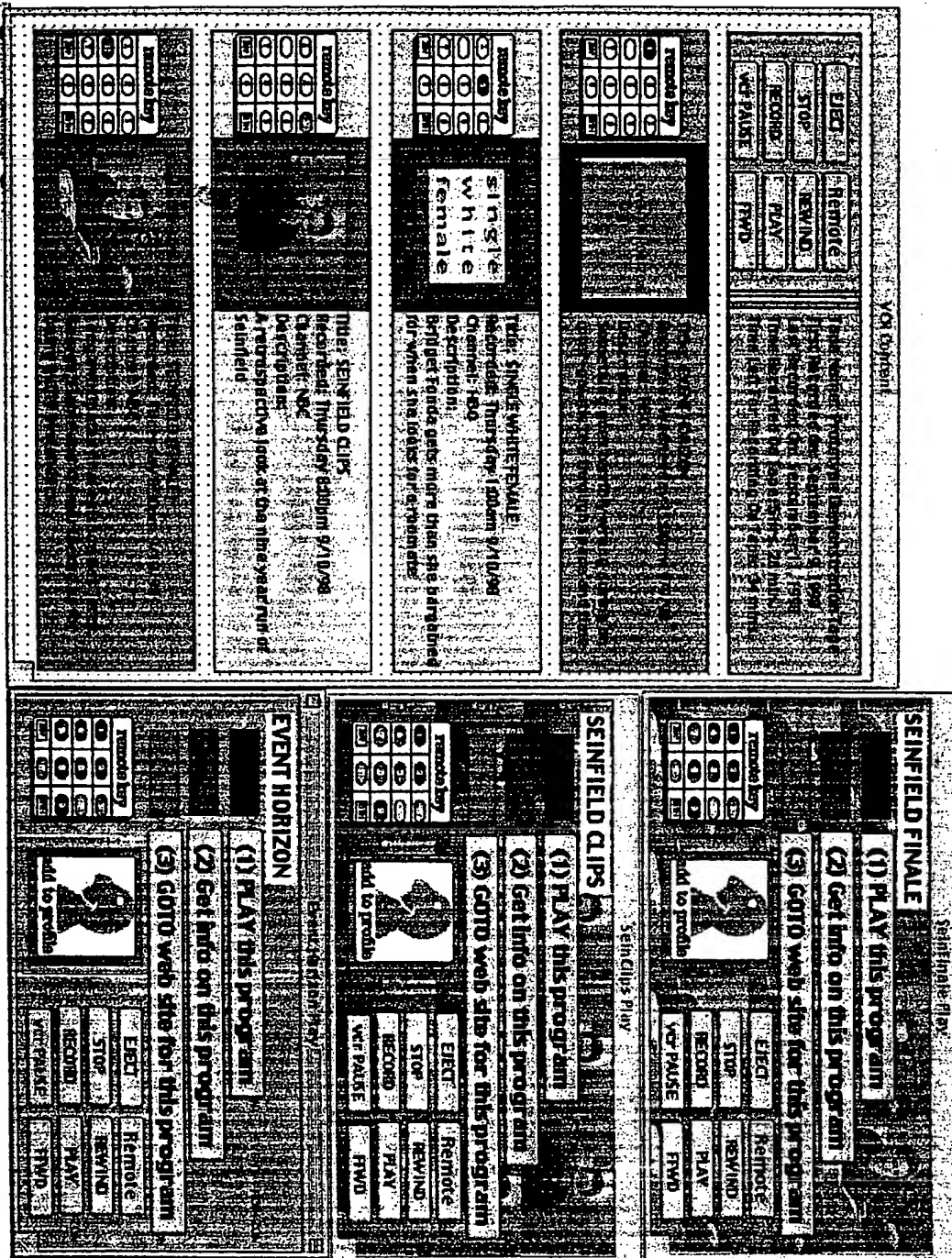


Figure 40

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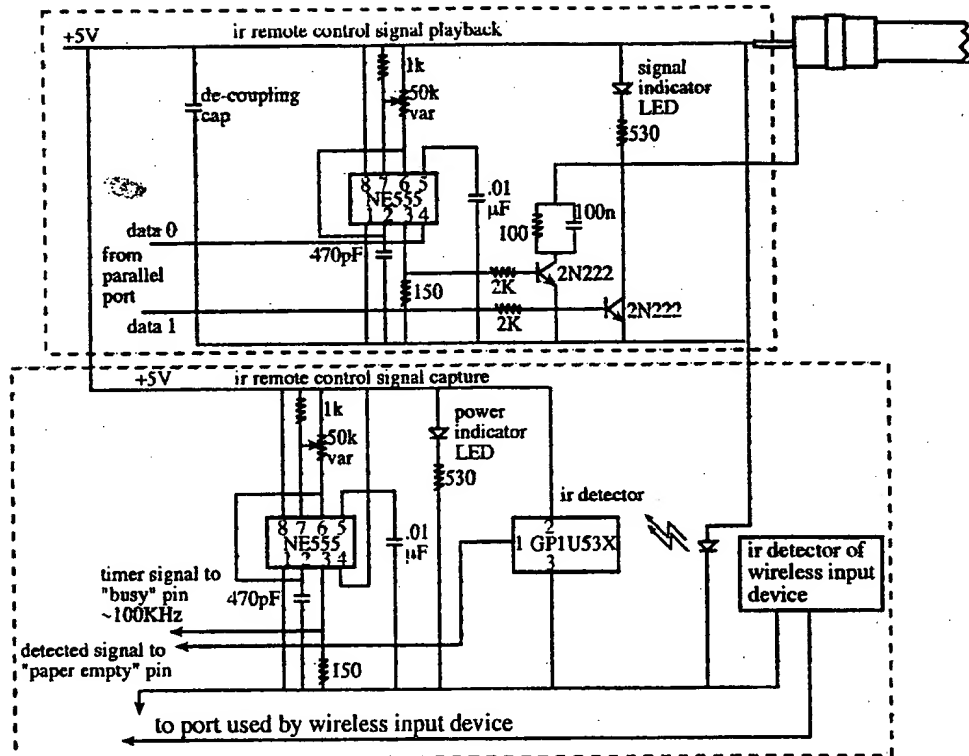


Figure 41(a)

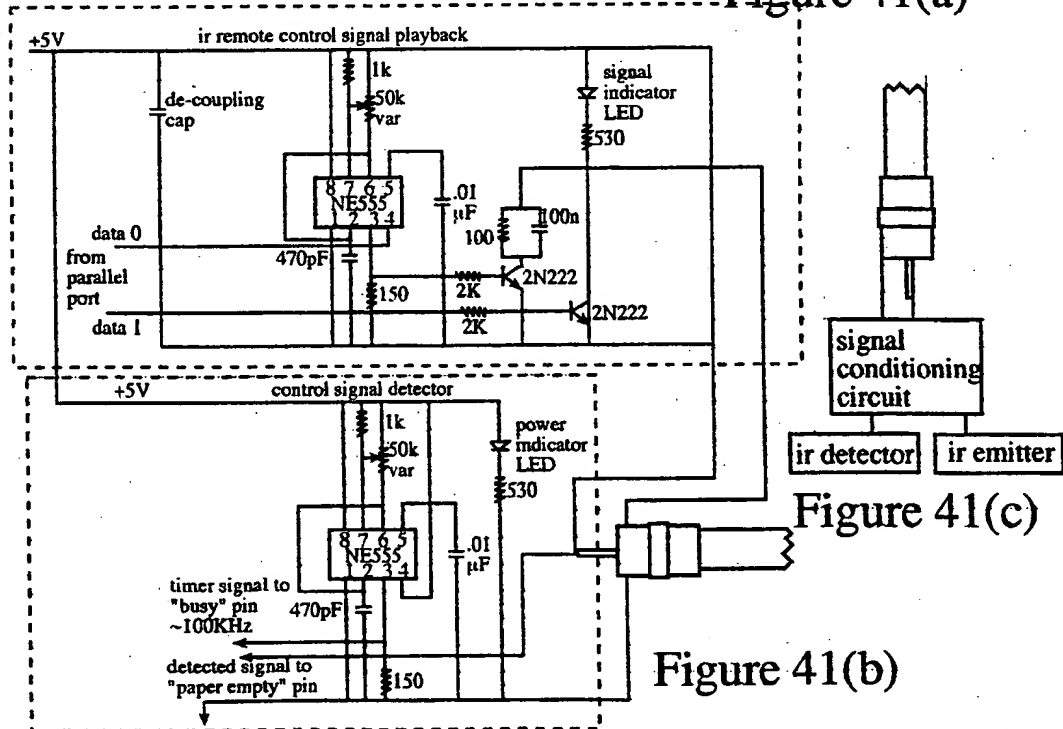


Figure 41(b)

Figure 41(c)



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Method of learning remote control  
device signals for network devices

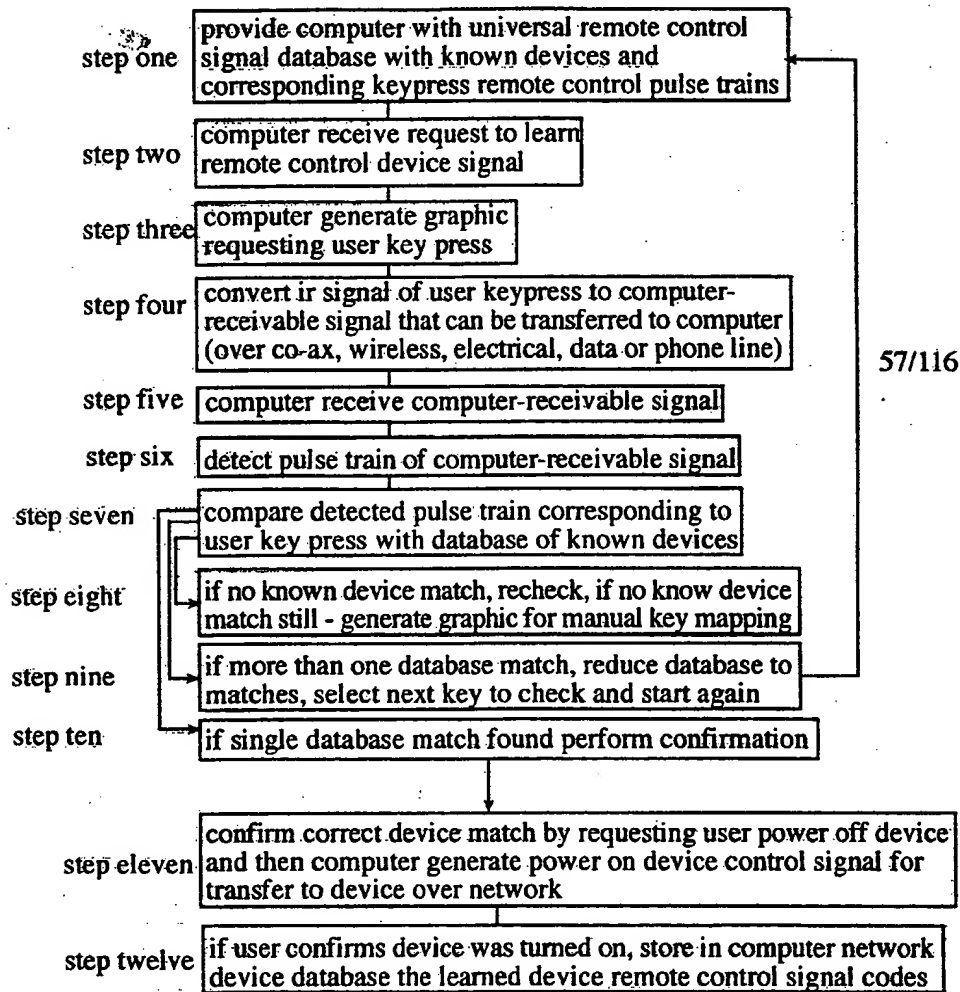


Figure 41(d)

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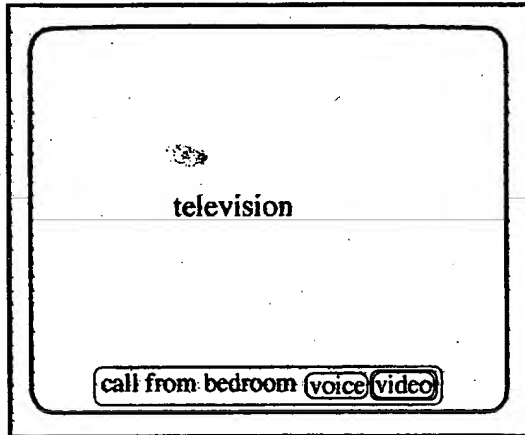


Figure 42(a)

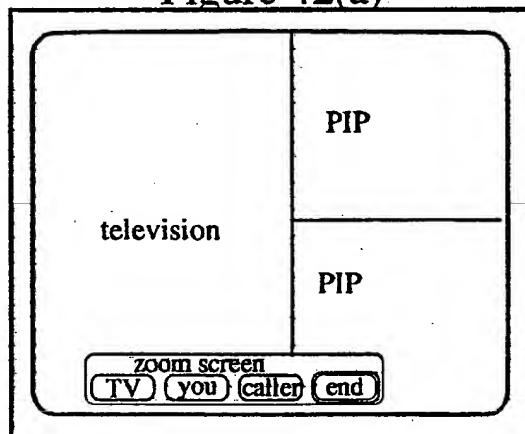


Figure 42(b)

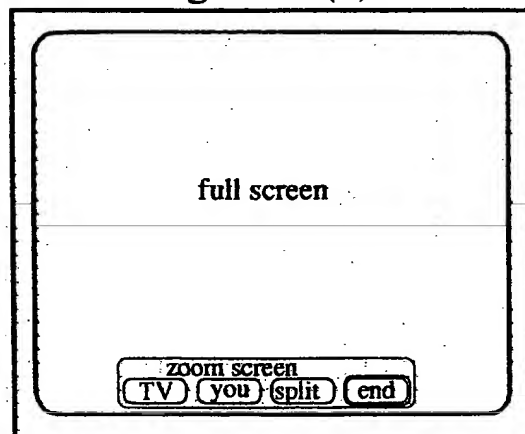


Figure 42(c)

## Video Intercom Figure 43

caller initiates call by sending  
intercom request to computer

send call notification to receiver:  
determine receiver's channel selection  
switch computer tuner1 to receiver's channel  
selection  
zoom tuner1 to full screen  
open window "call from..."  
automatically switch receiver's tv to computer  
local channel:  
generate device control signals using computer or  
external microprocessor to switch receiver's tv to

if receiver selection = "video"

computer video output for receiver's tv:  
switch computer tuner2 to receiver ccd  
switch computer tuner3 to caller ccd  
switch computer audio out to caller mic  
close window "call from..."  
open window "split zoom selection"  
resize tuner1, tuner2 and tuner3 screen to  
show split screen PIPs

if receiver selection = "voice"

computer video output for receiver's tv:  
switch computer tuner2 to receiver ccd  
switch computer tuner3 to caller ccd  
switch computer audio out to caller mic  
close window "call from..."  
open window "tv zoom selection"  
zoom tuner1 to full screen (if necessary)

if no receiver selection after time out

automatically switch receiver's tv back to  
receiver's channel selection

when end is selected by either caller or receiver

automatically switch receiver's tv back to  
receiver's channel selection

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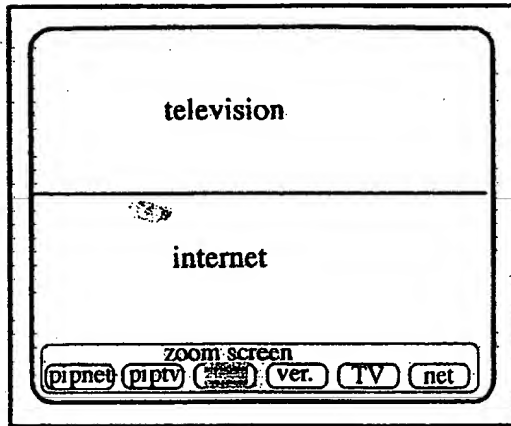


Figure 44(a)

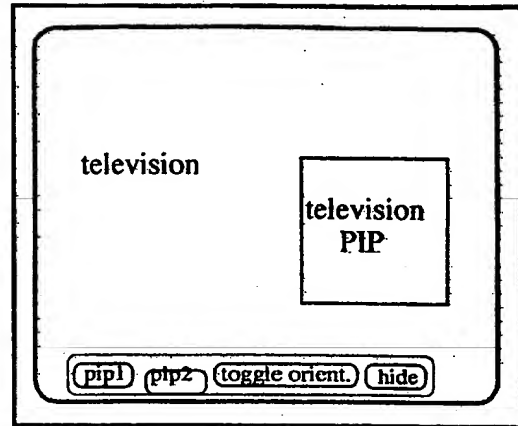


Figure 45(a)

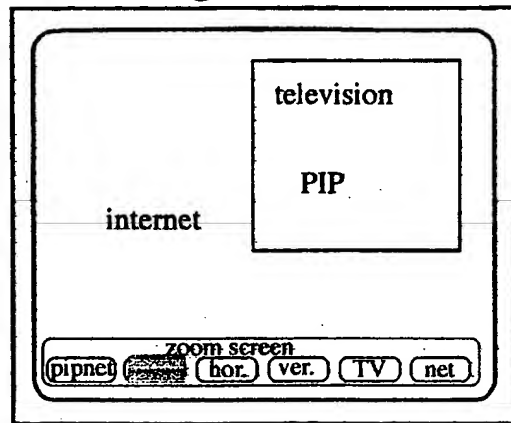


Figure 44(b)

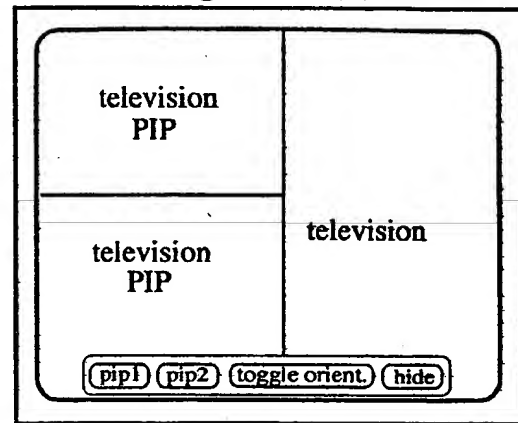


Figure 45(b)

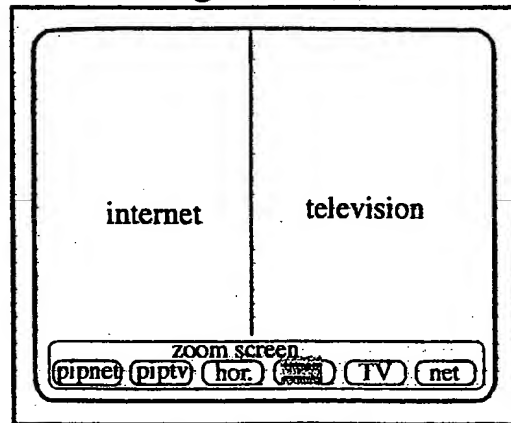


Figure 44(c)

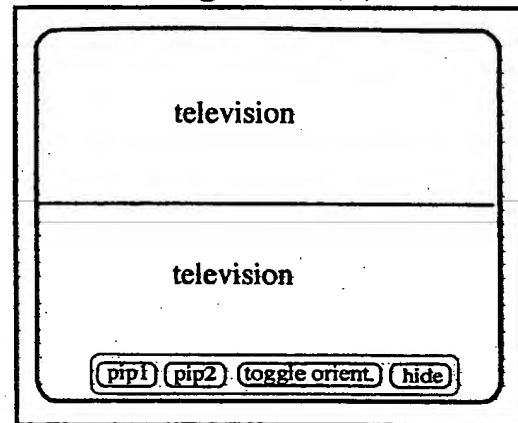


Figure 45(c)

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## Computer-Enabled Recording of Radio Programs with Content-Indicating Information Signal

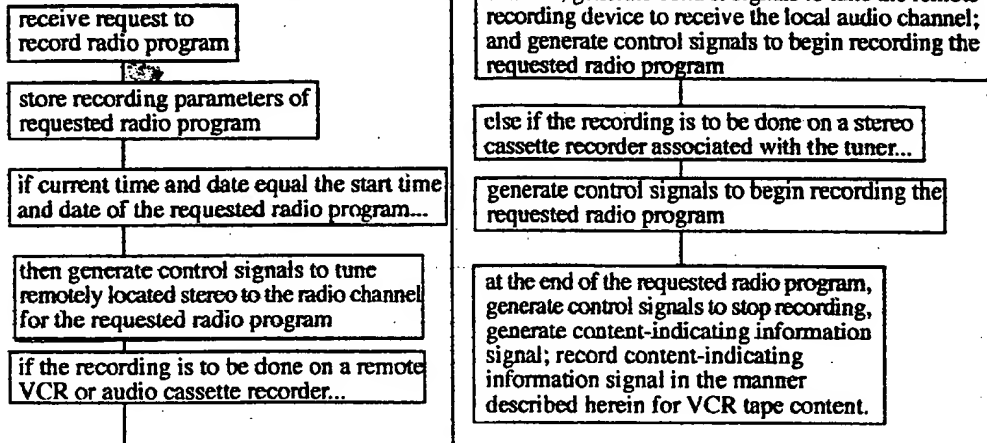


Figure 46

## VCR tape duplication and editing system

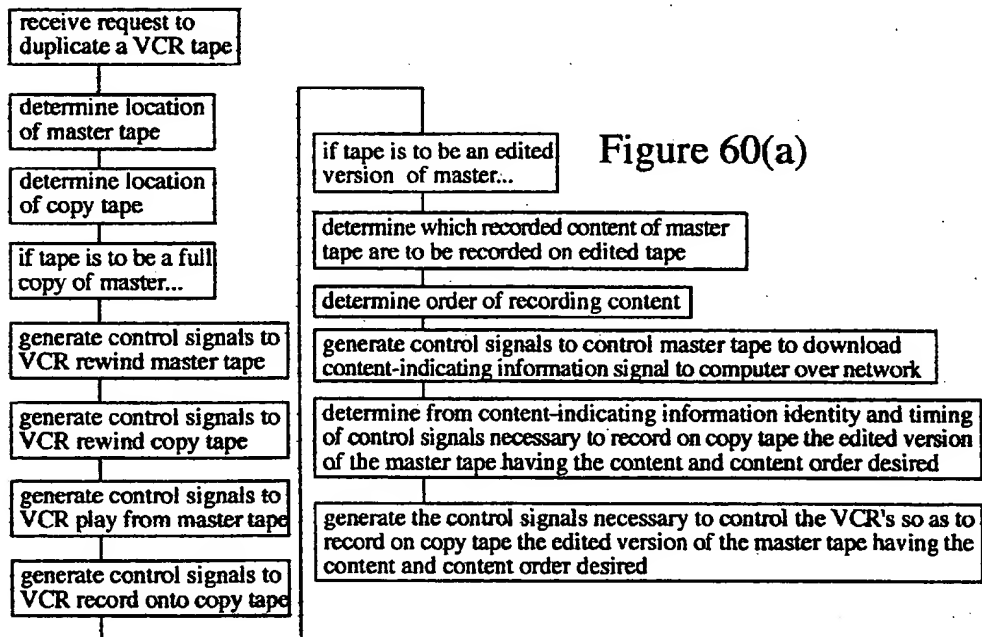
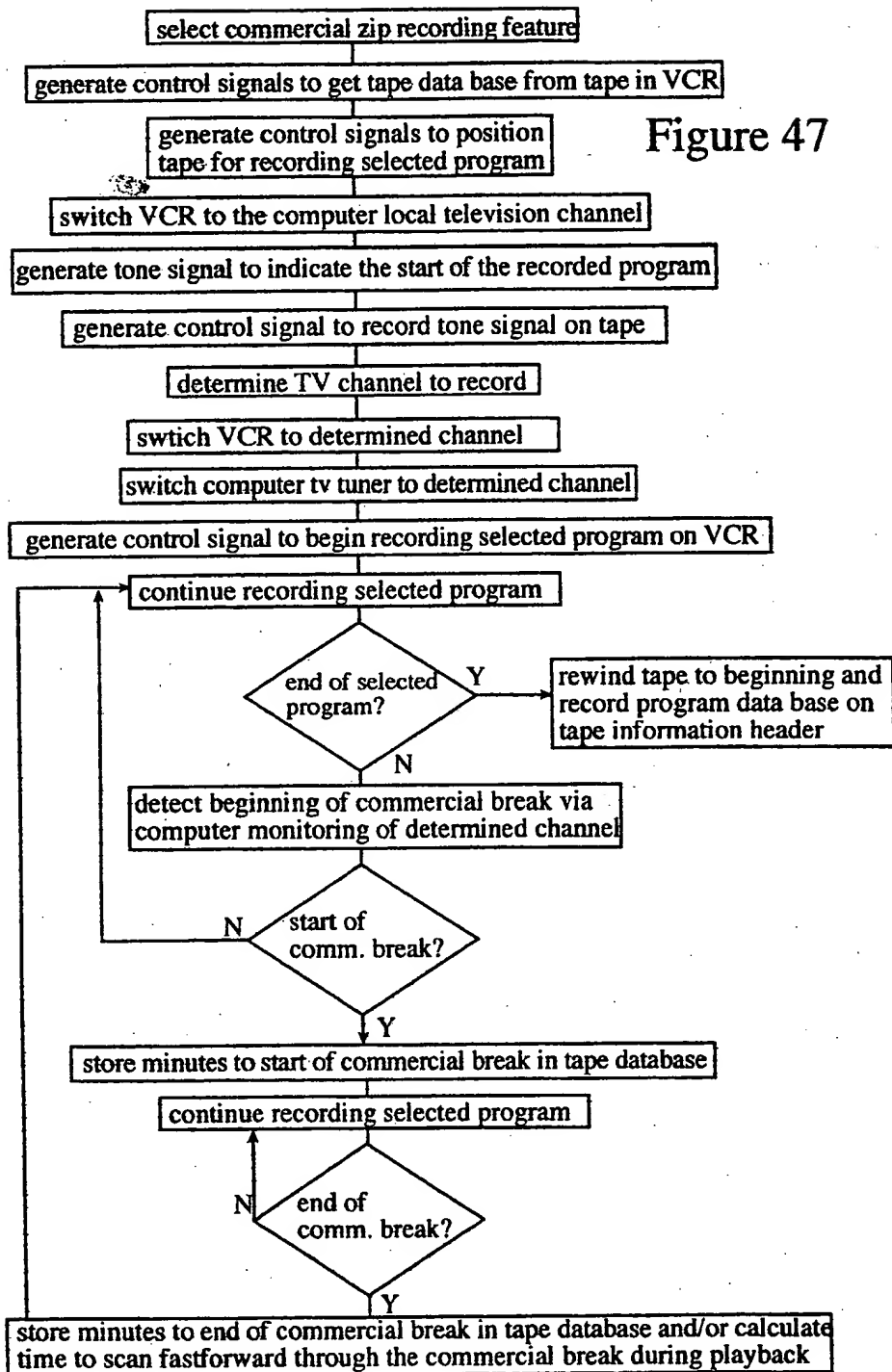


Figure 60(a)

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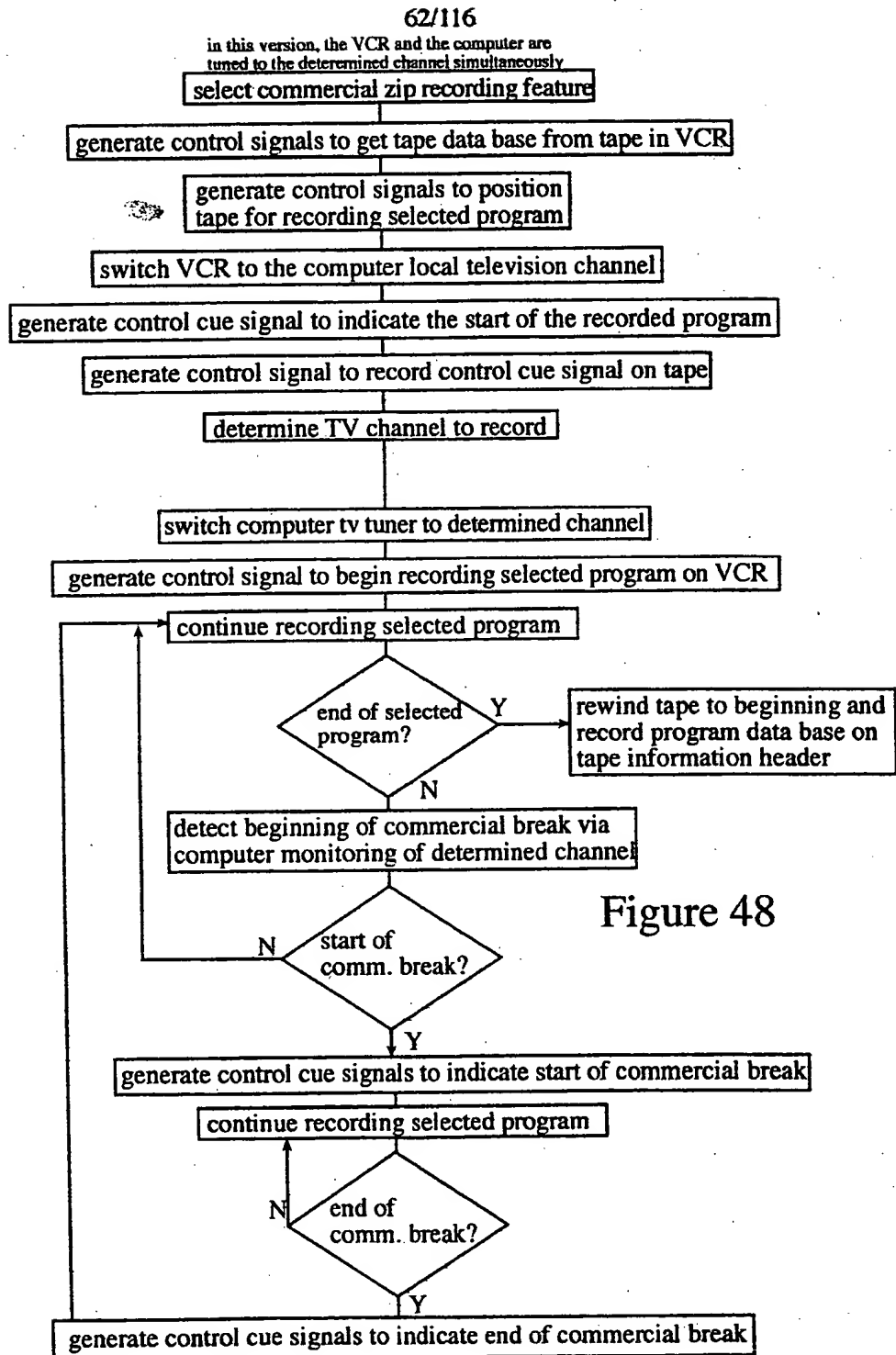
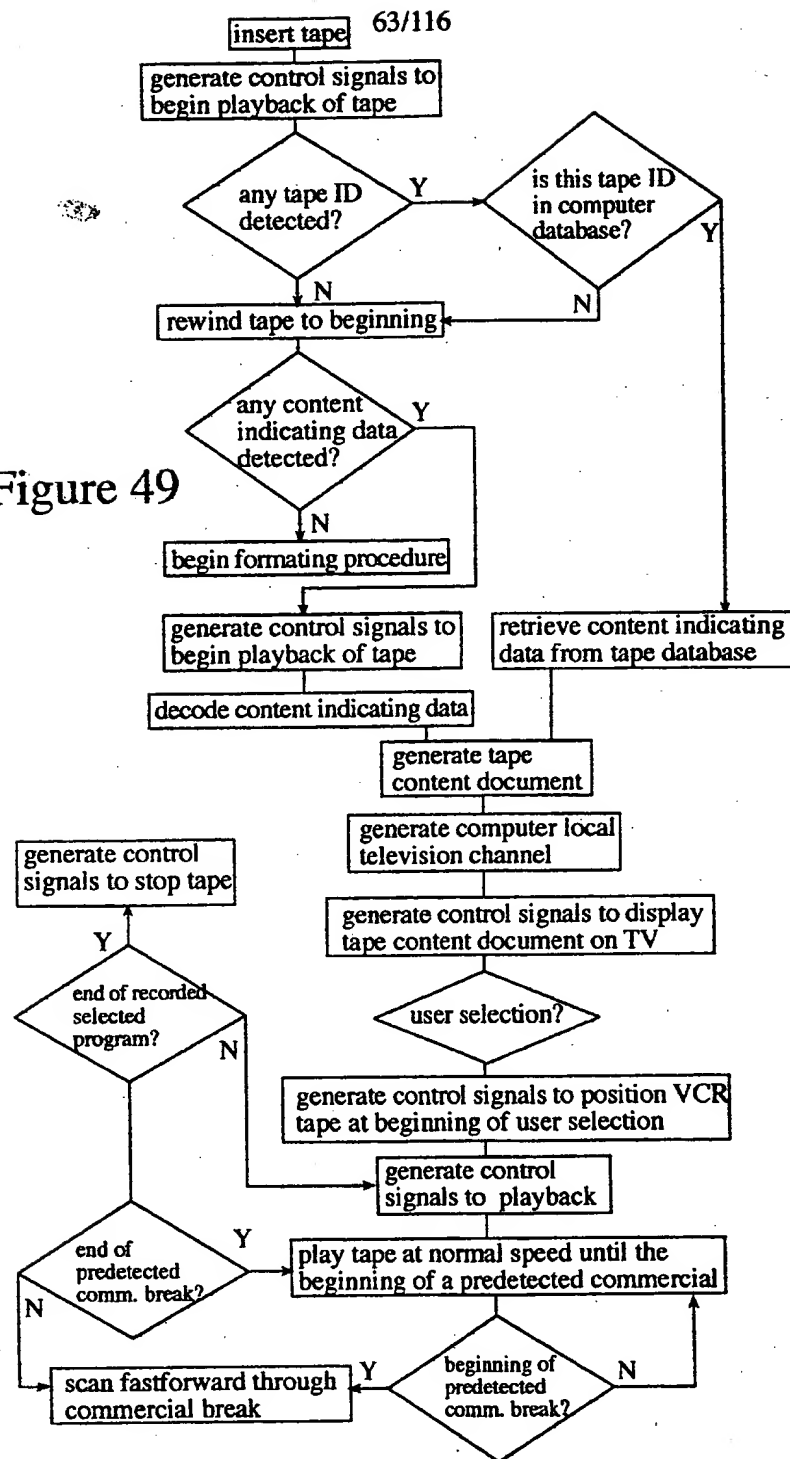


Figure 48

Figure 49



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## TV Viewing Autopilot

determine identity by receiving id code, voice recognition or through GUI interaction

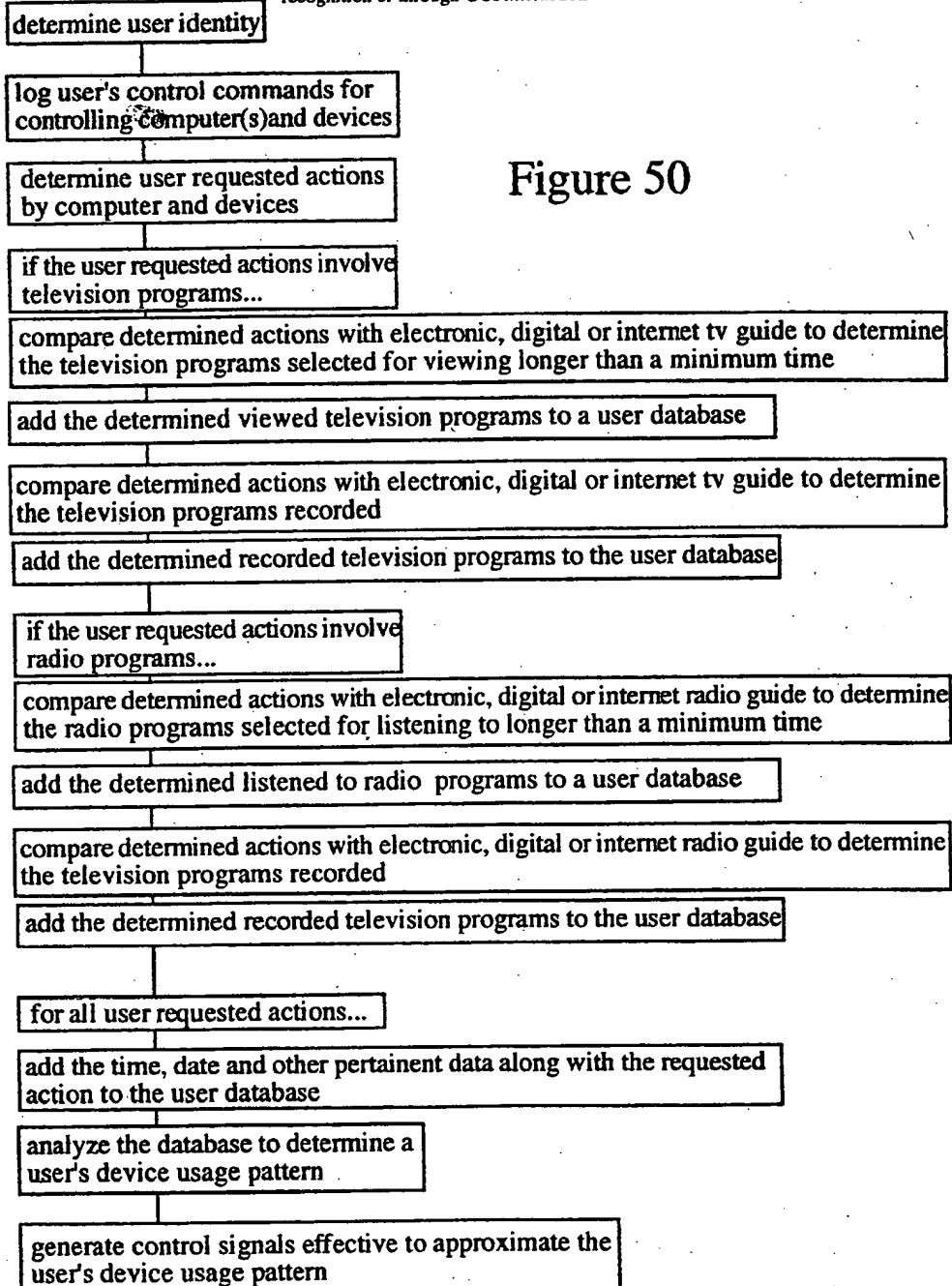


Figure 50



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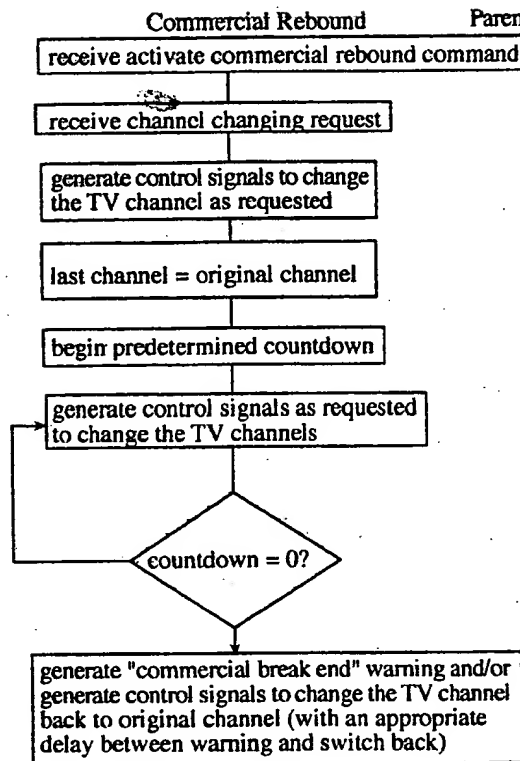


Figure 51

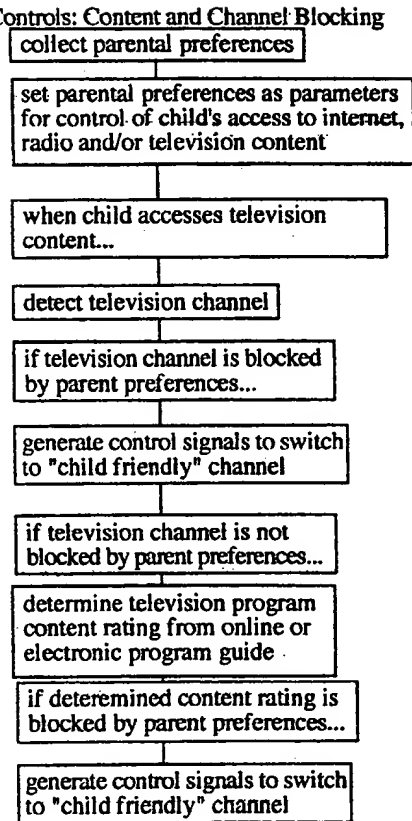


Figure 52

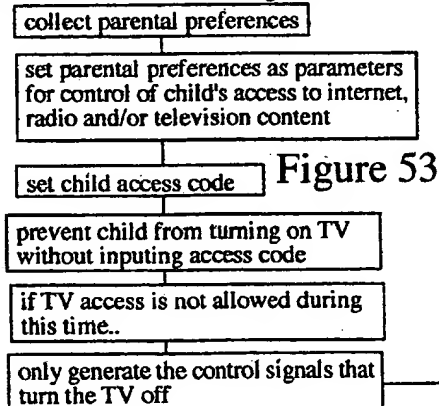
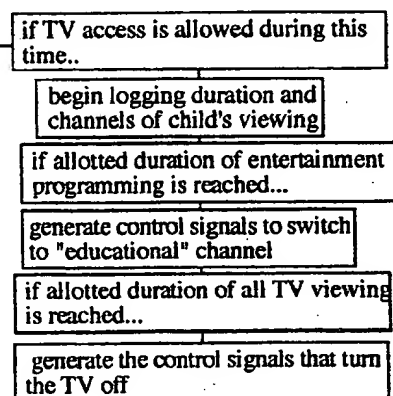
**Parental Controls: TV Viewing Time Restraints**

Figure 53



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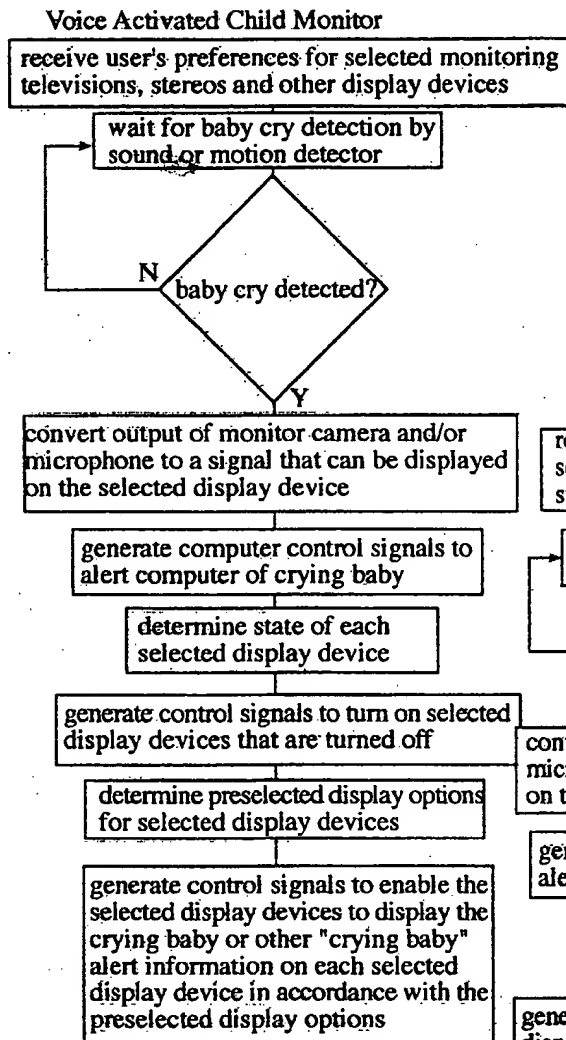


Figure 54

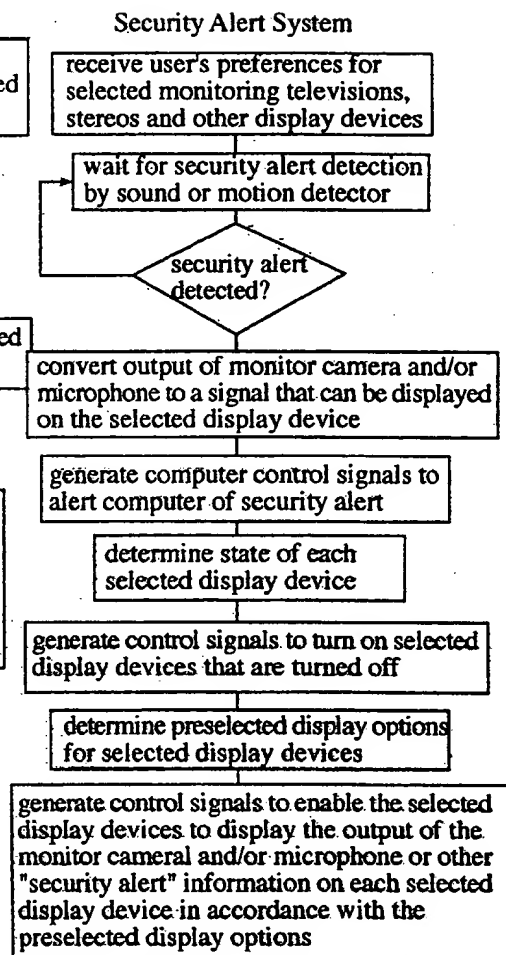


Figure 55

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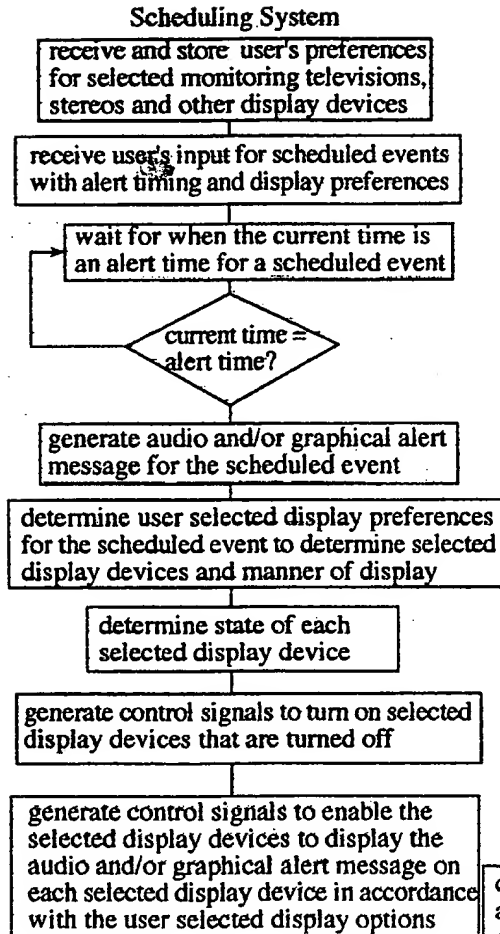


Figure 56

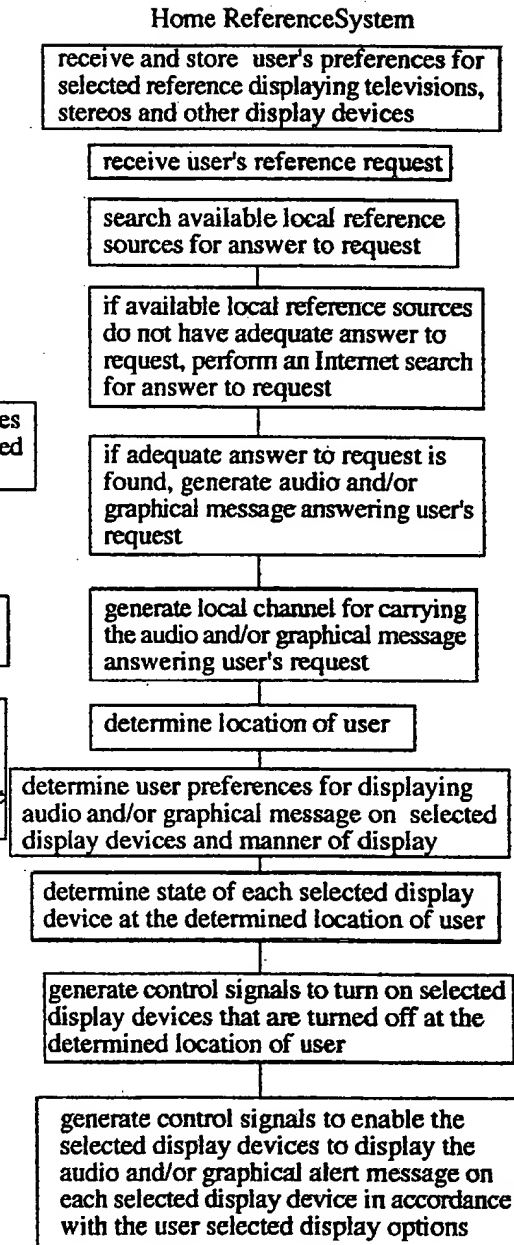
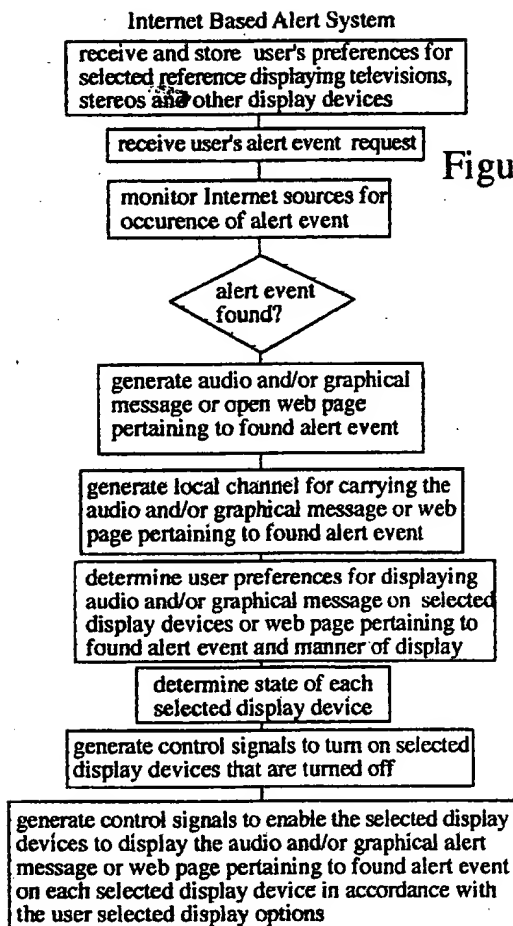


Figure 57

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Figure 58



monitoring internet might be a continuous background check of stock quotes, news items, weather reports etc. if Internet connection is continuous. If Internet connection is not continuous, then automatic connections and searching for the event can occur. The timing and frequency of the connection can be selected and specific for type of alert (stock quotes every 1/2 hour during trading day, weather alerts two or three times a day, etc.)

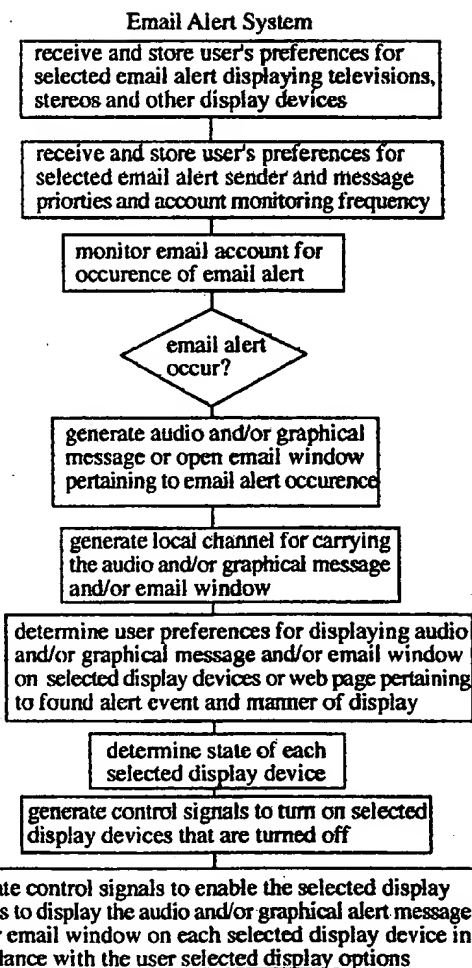


Figure 59

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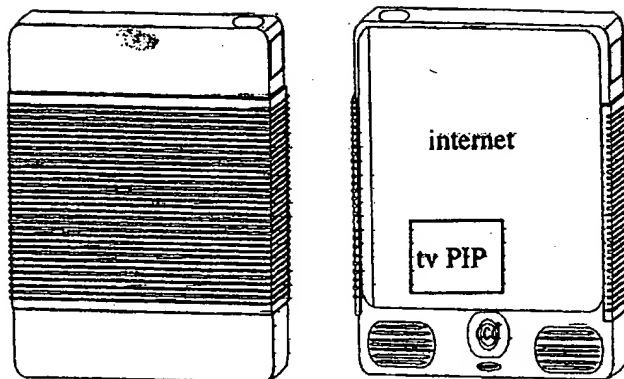


Figure 60(c)

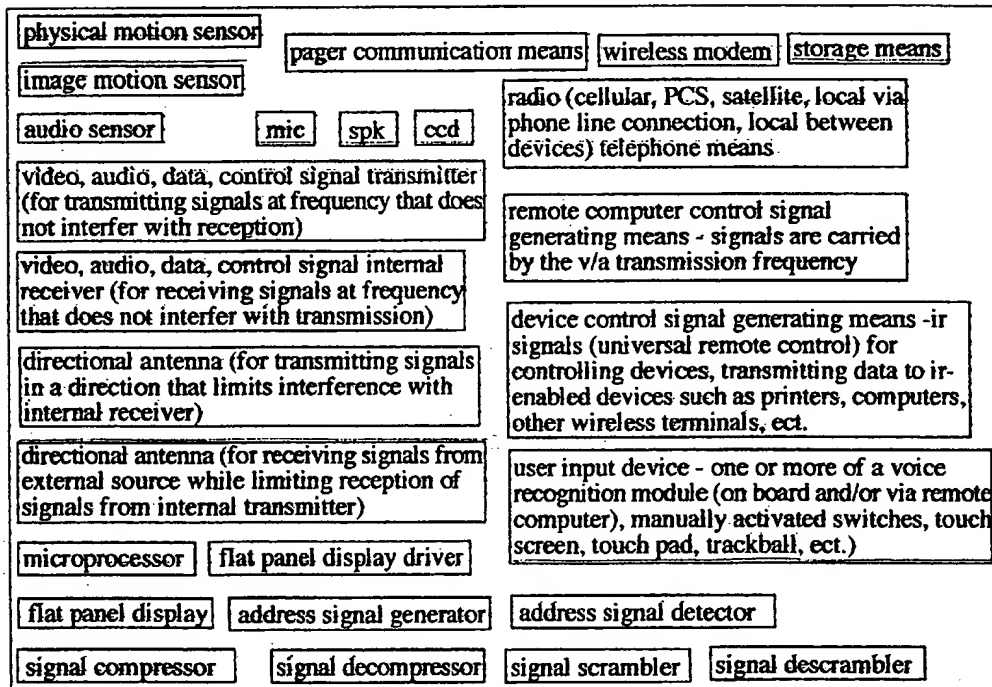
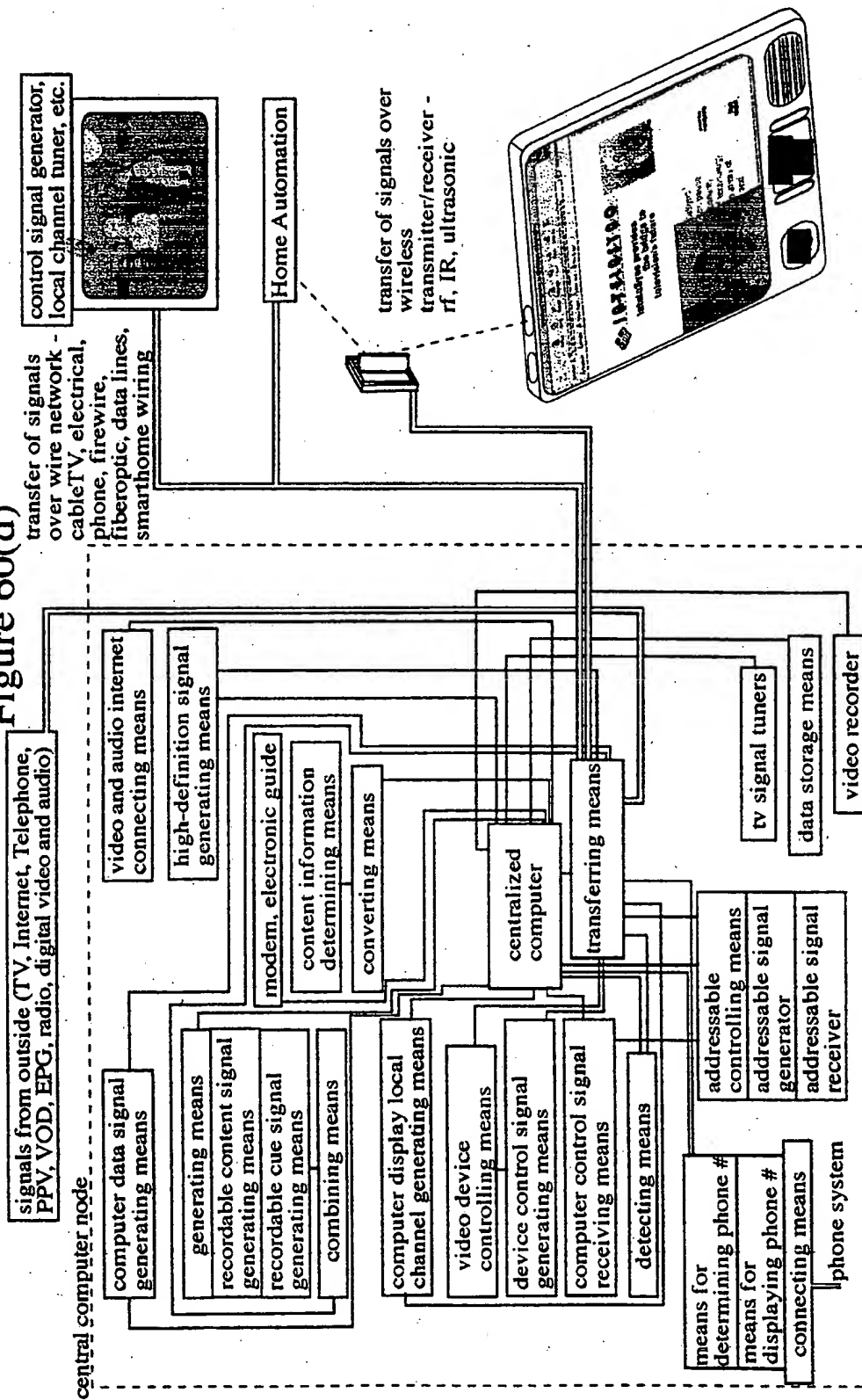


Figure 60(d)



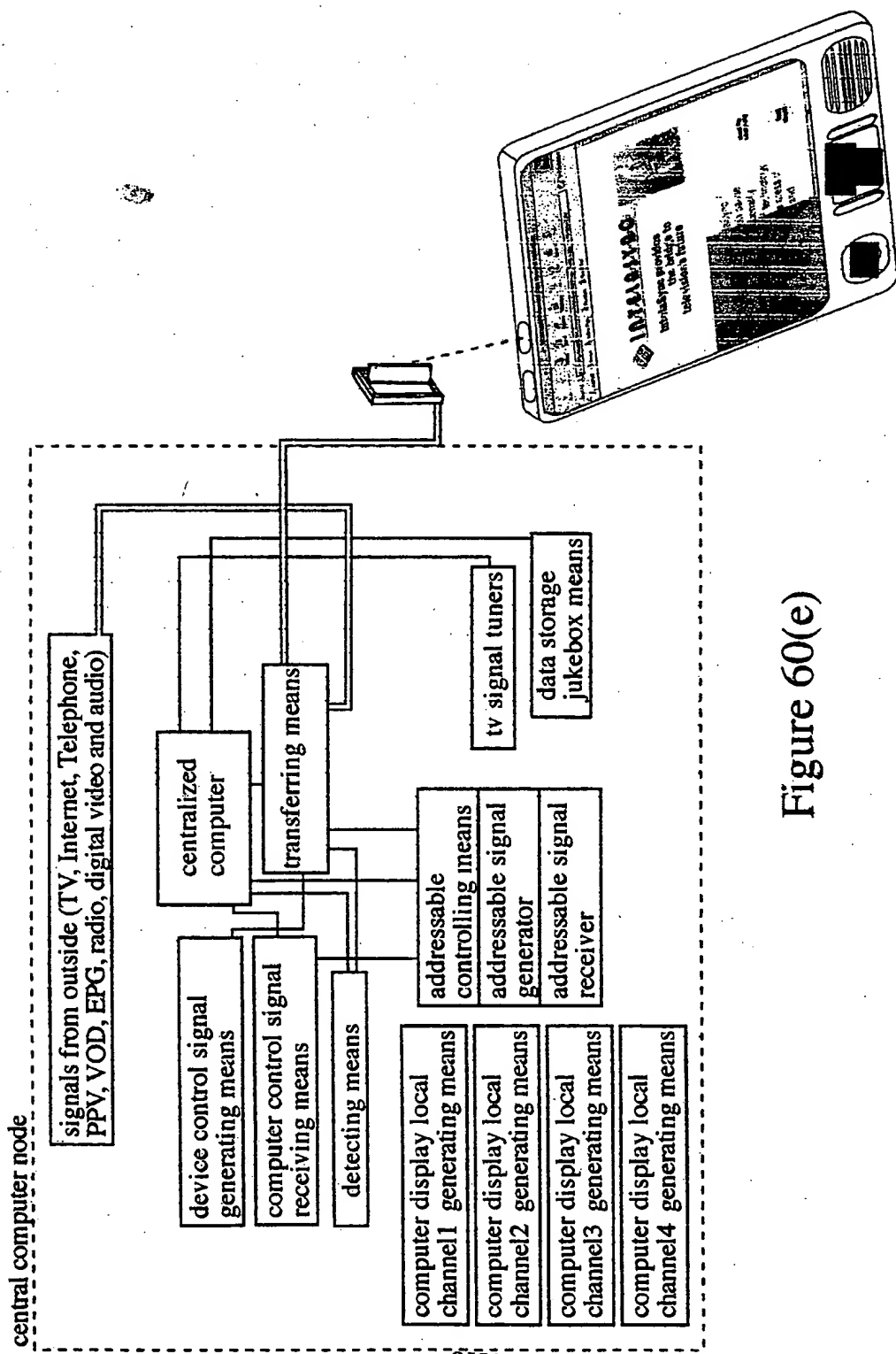
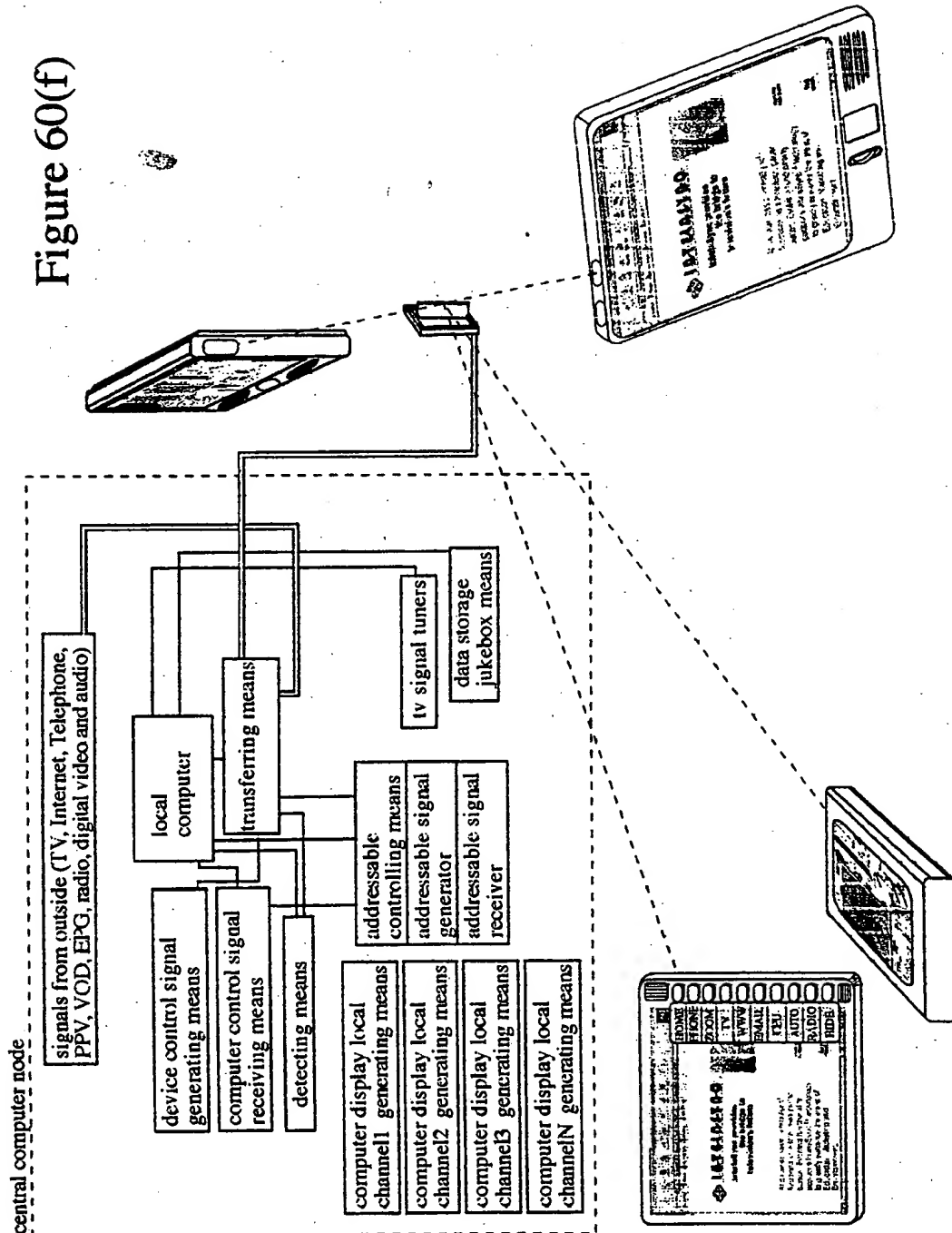


Figure 60(e)

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Figure 60(f)





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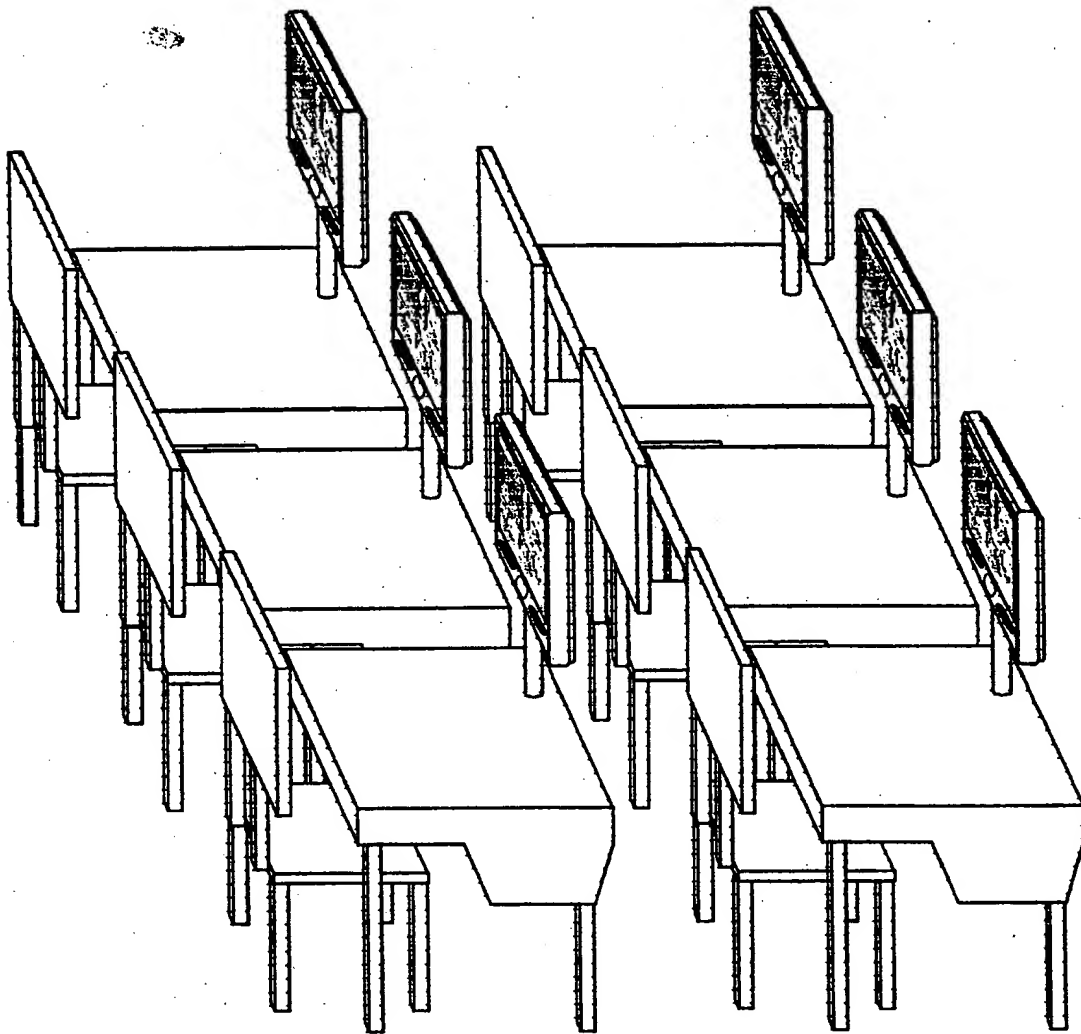


Figure 60(g)

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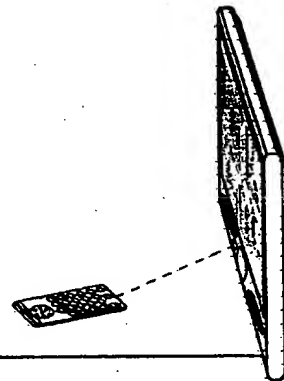
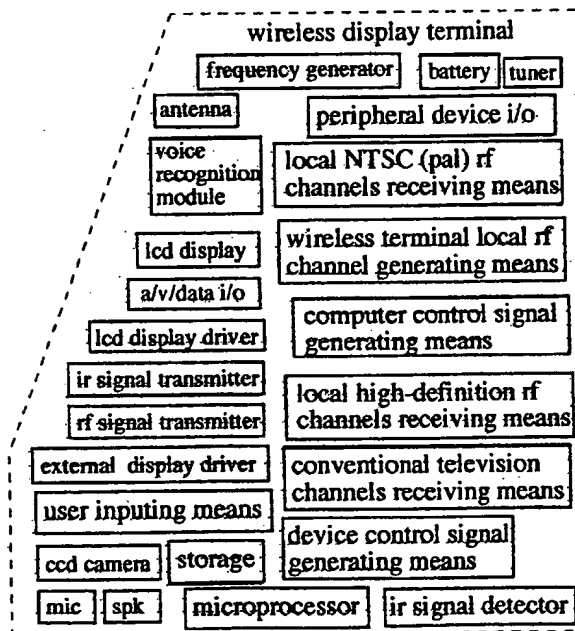
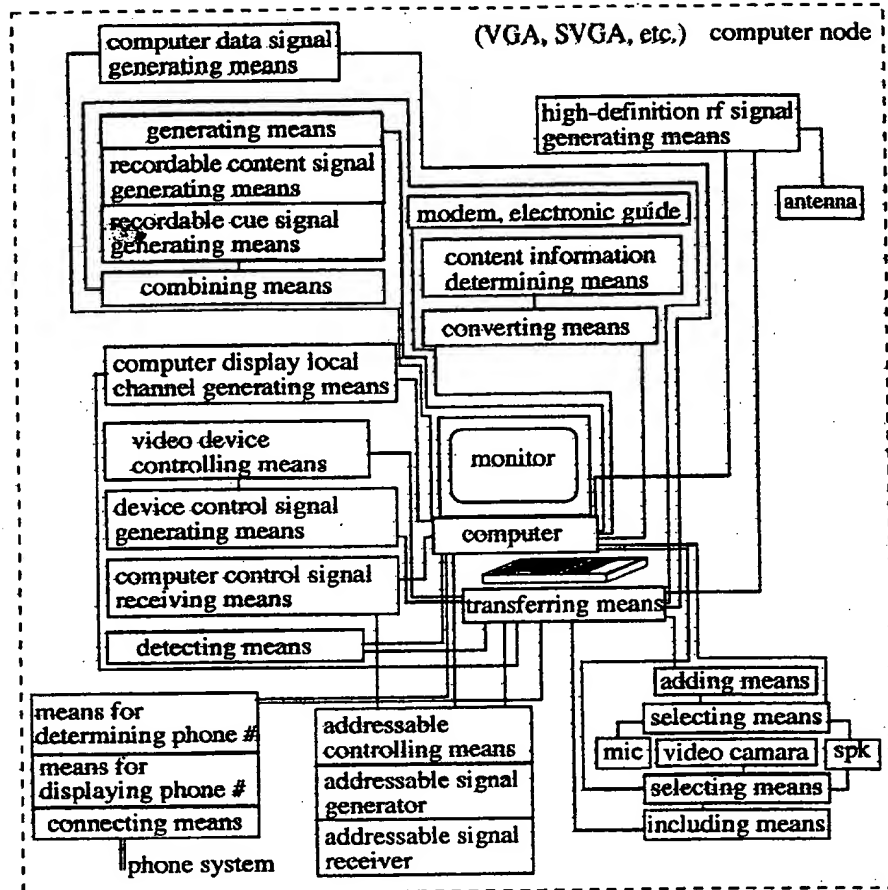


Figure 60(h)

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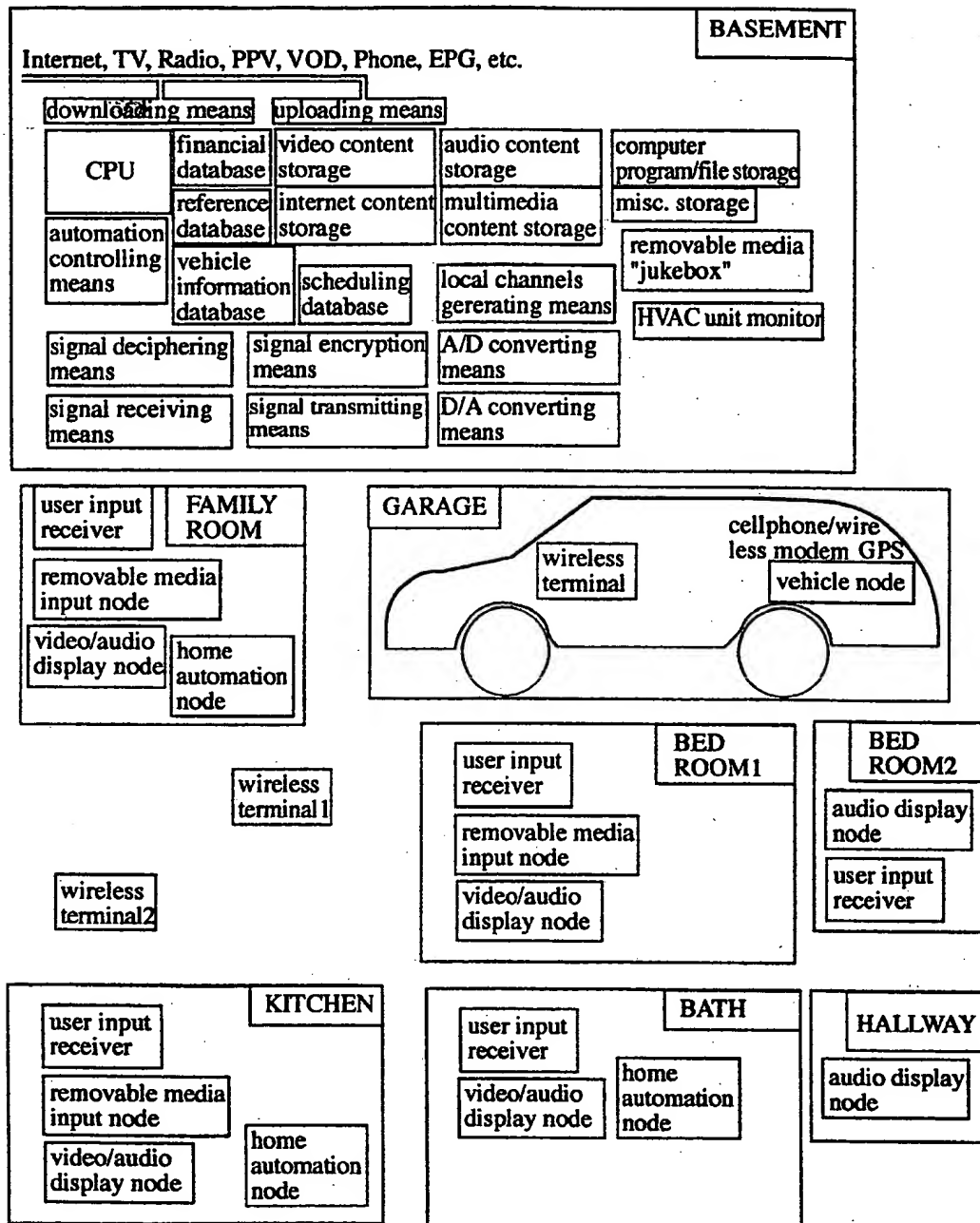


Figure 60(i)

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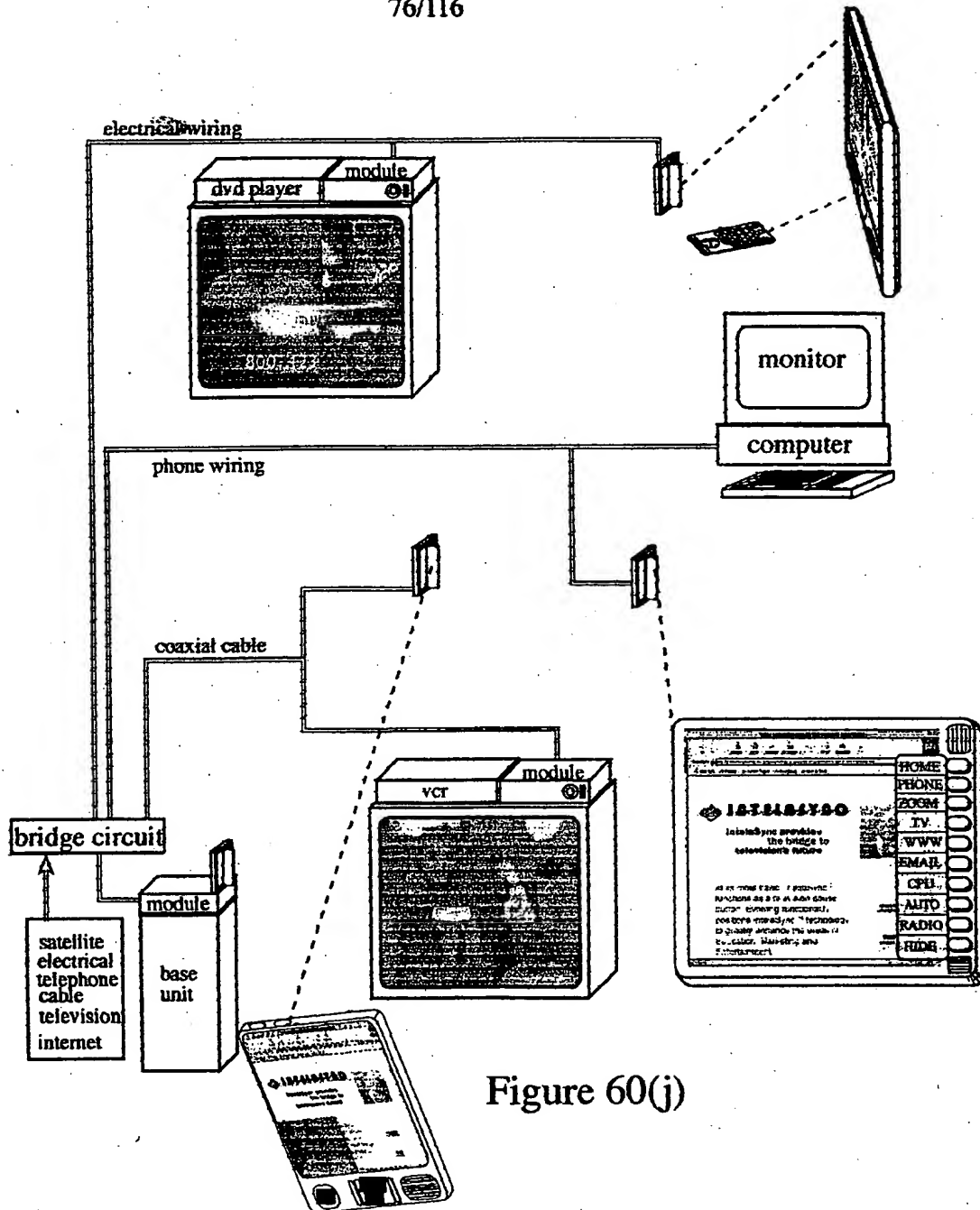


Figure 60(j)

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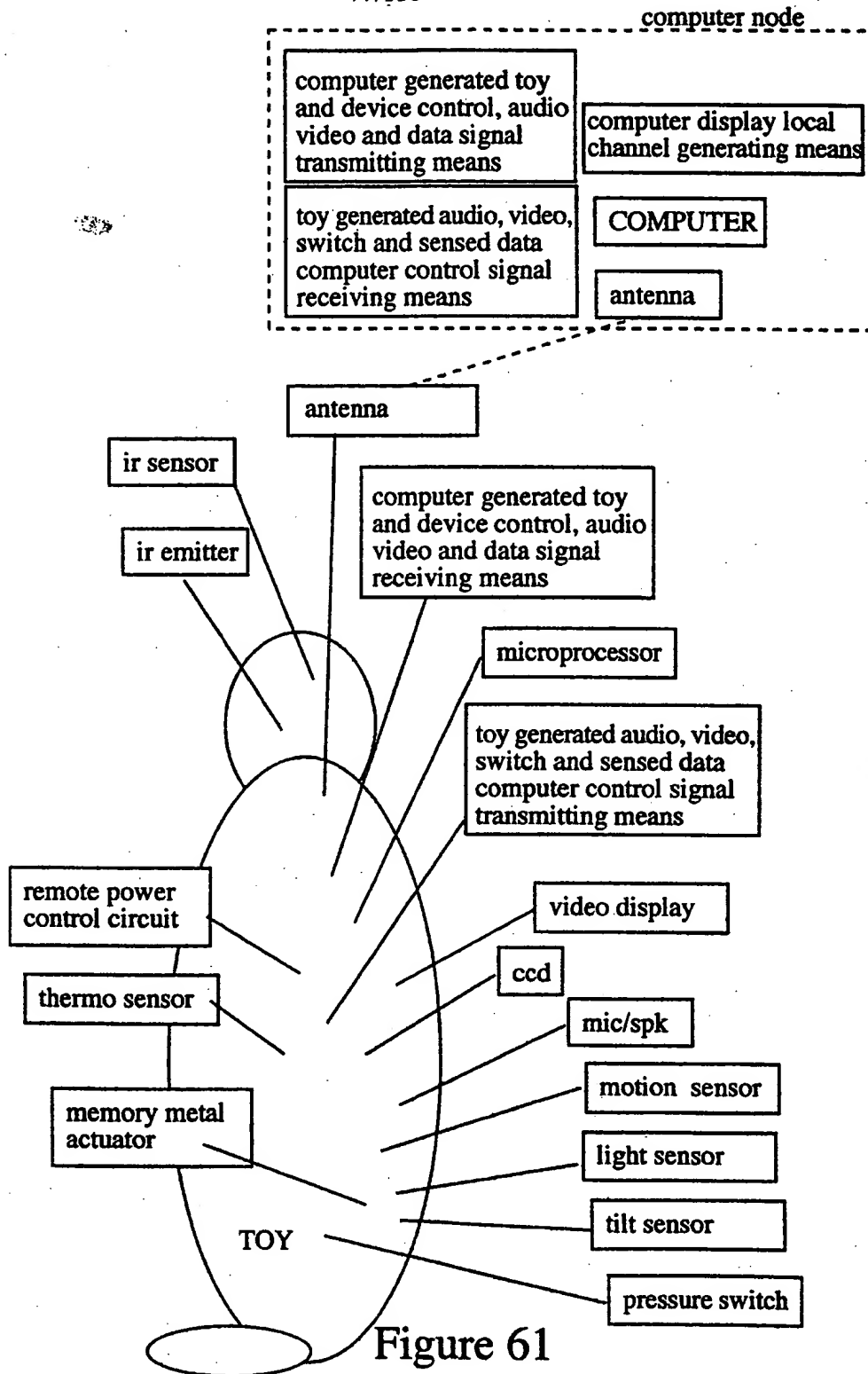


Figure 61

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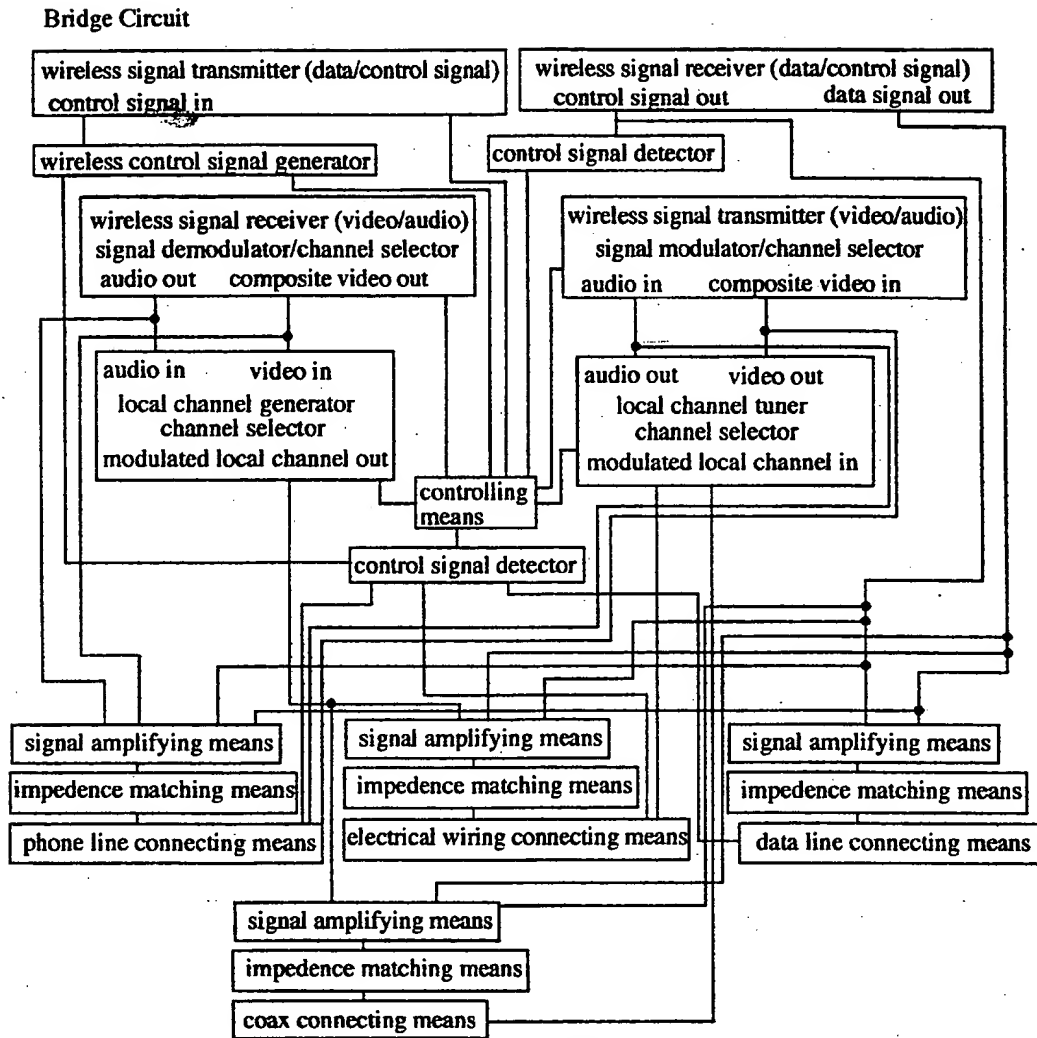


Figure 62(a)

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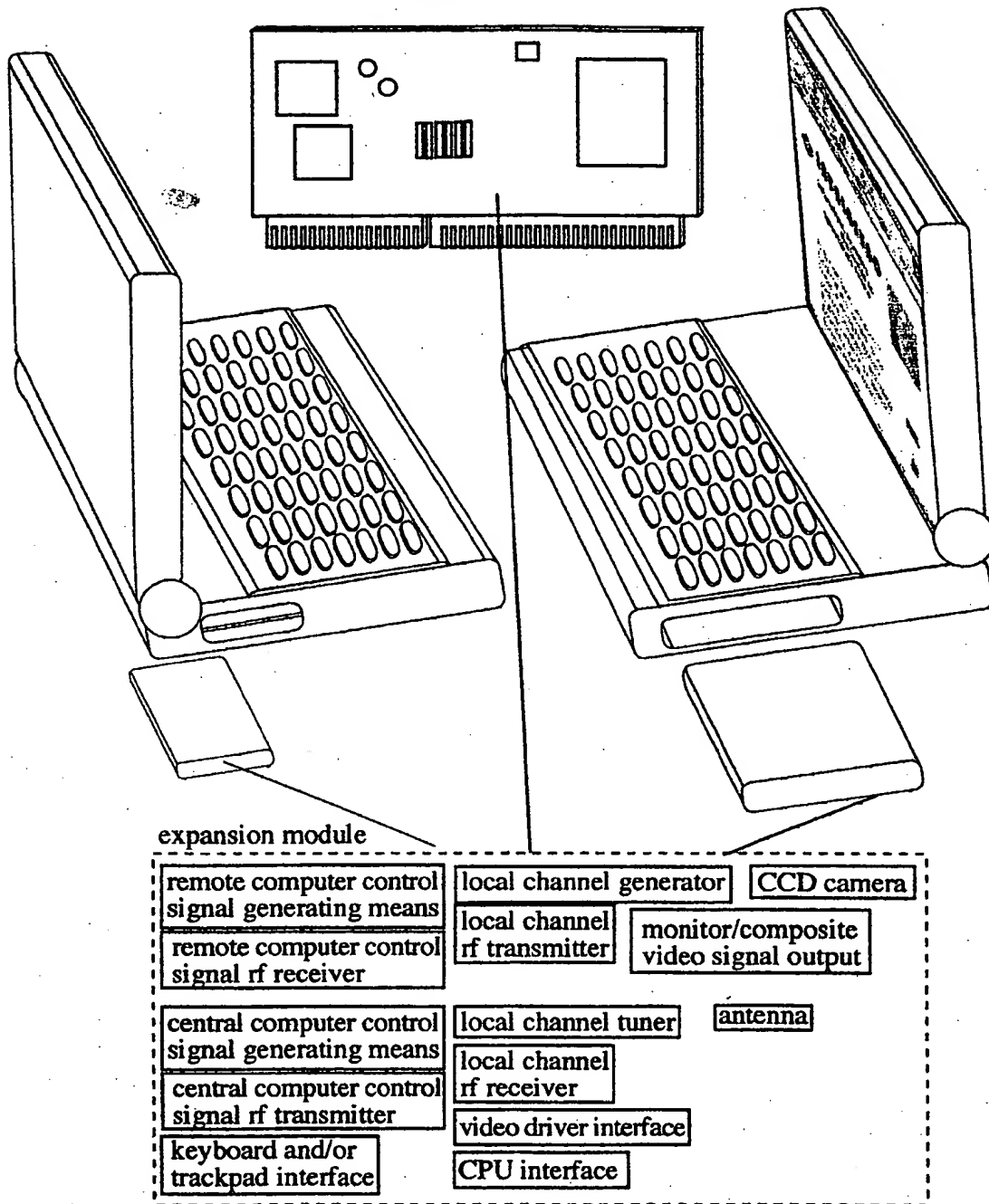
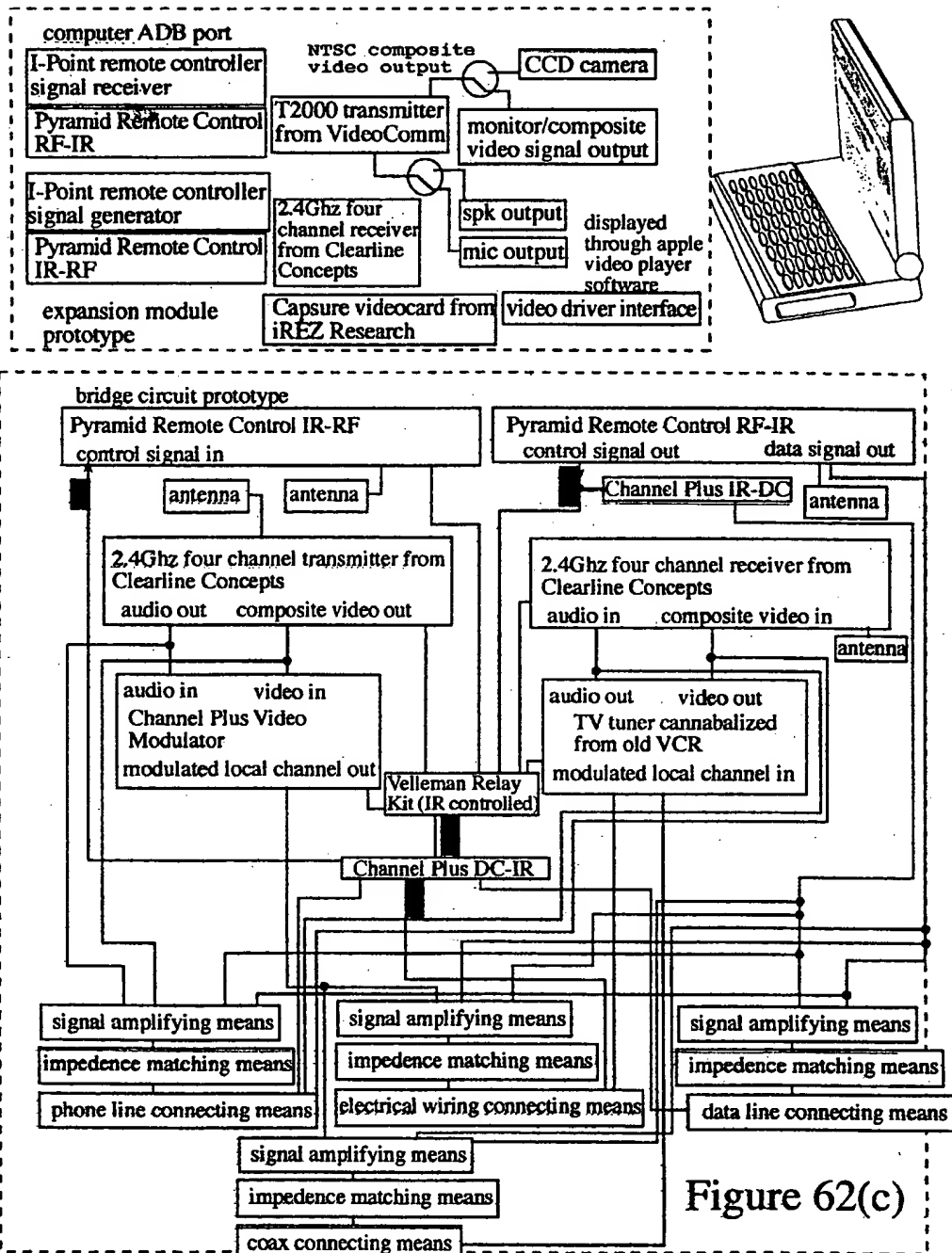


Figure 62(b)

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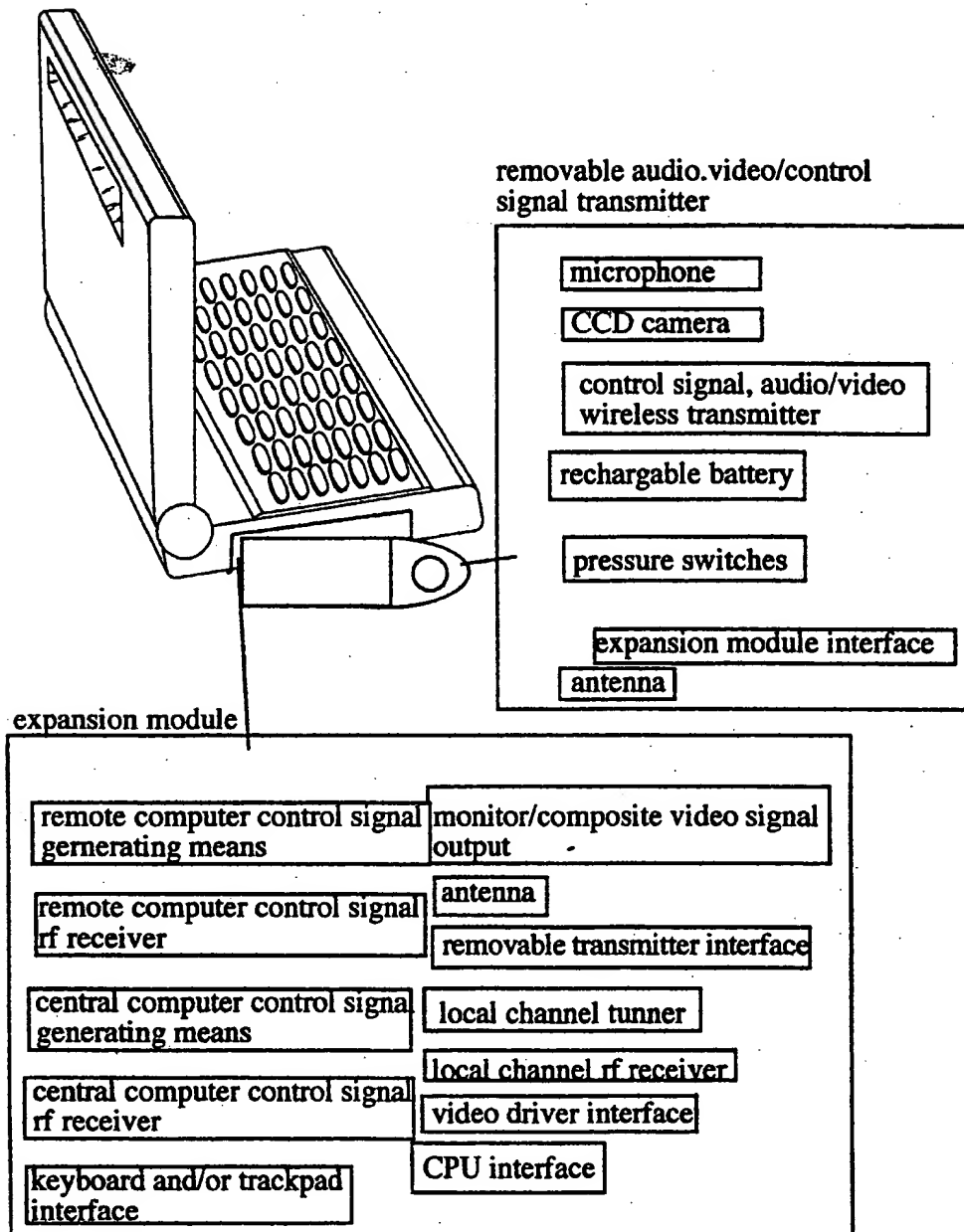


Figure 62(d)

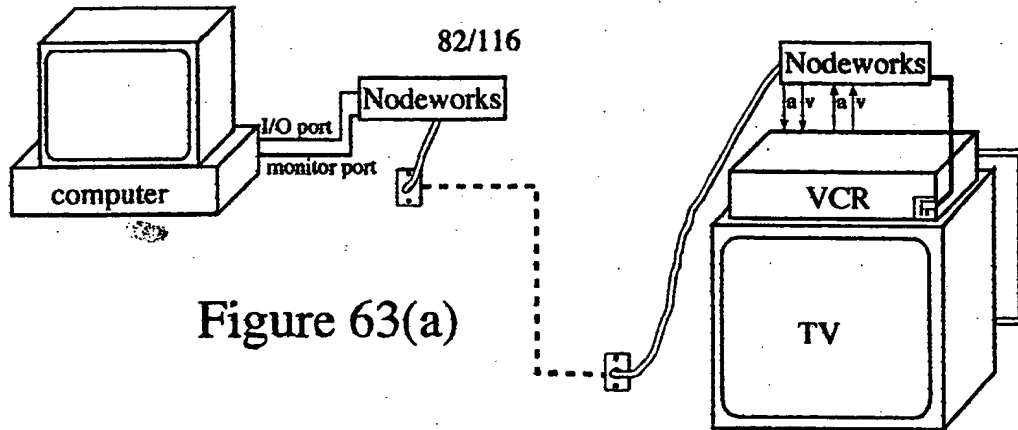


Figure 63(a)

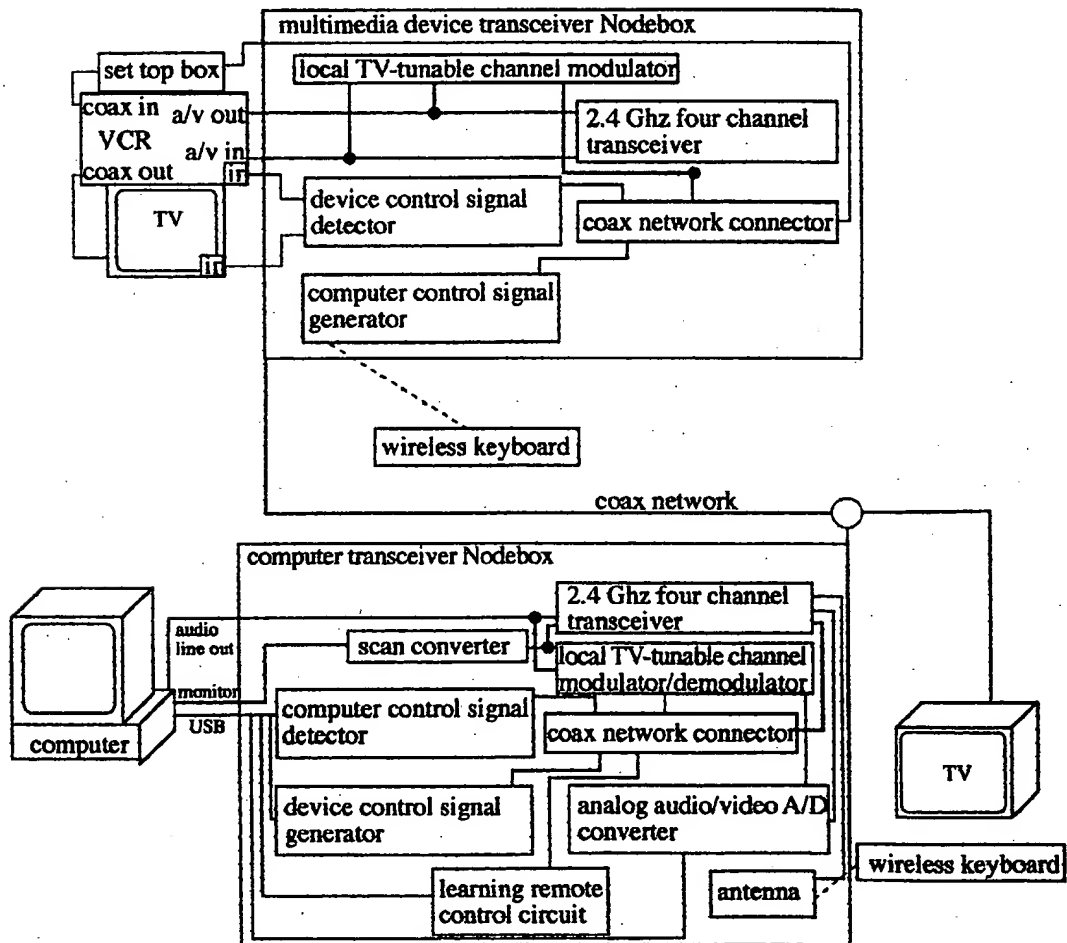


Figure 63(b)

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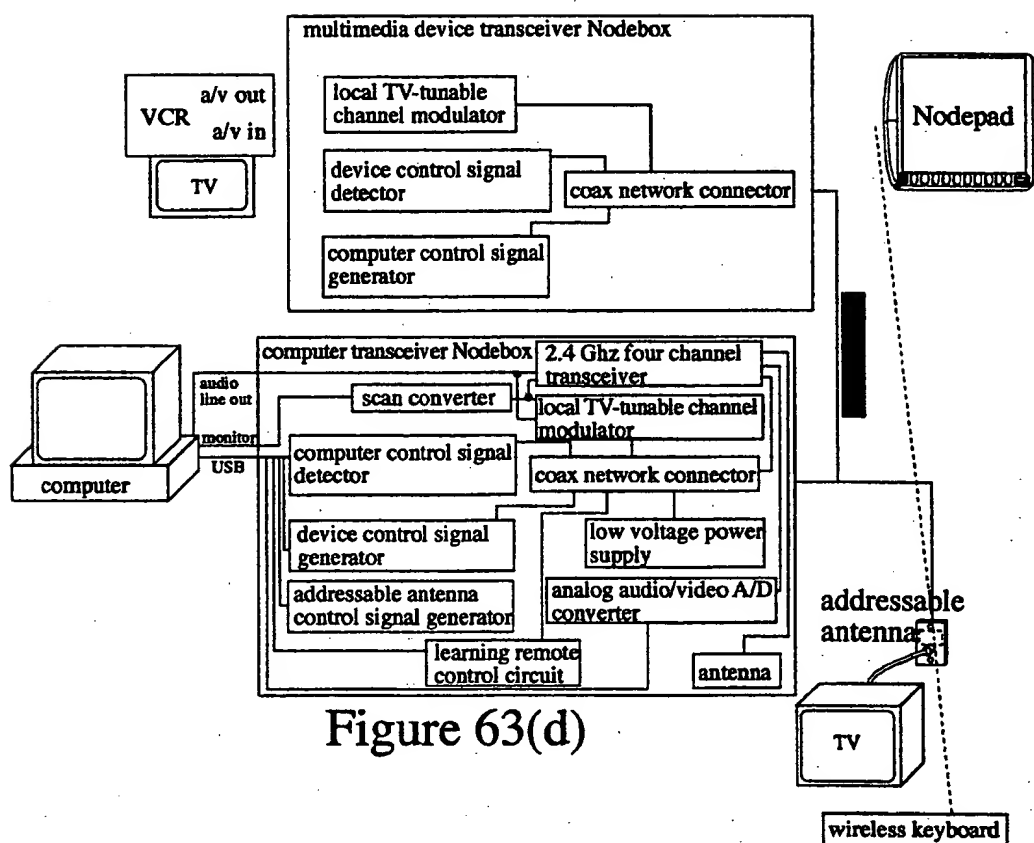


Figure 63(d)

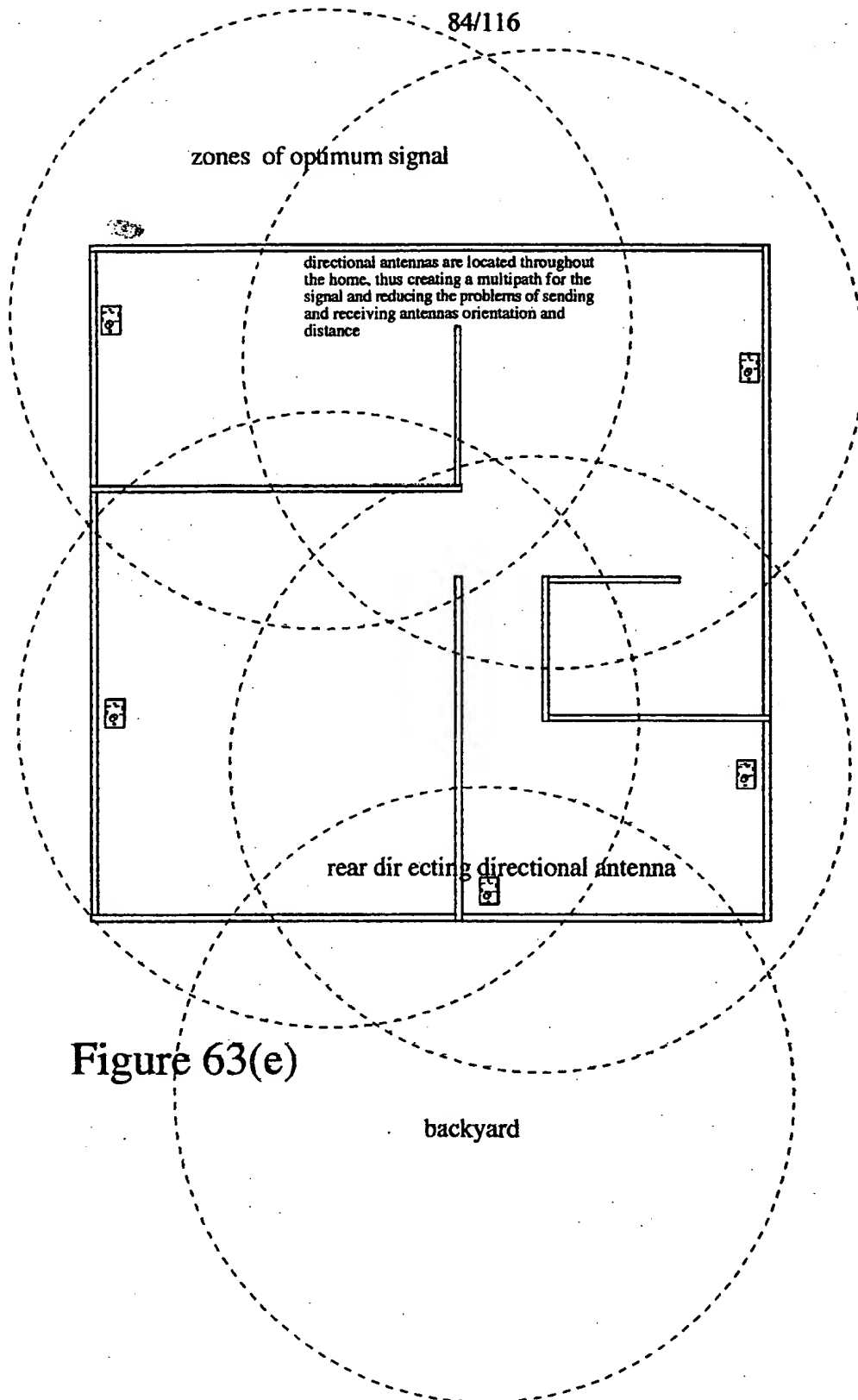


Figure 63(e)

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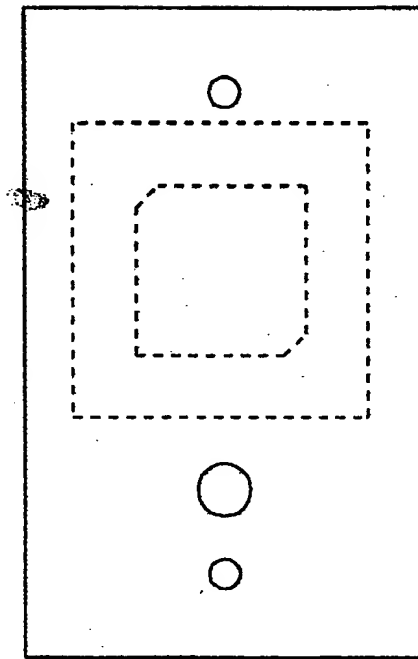


Figure 64(a)

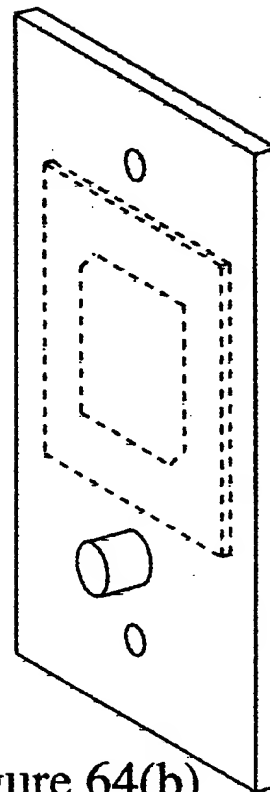


Figure 64(b)

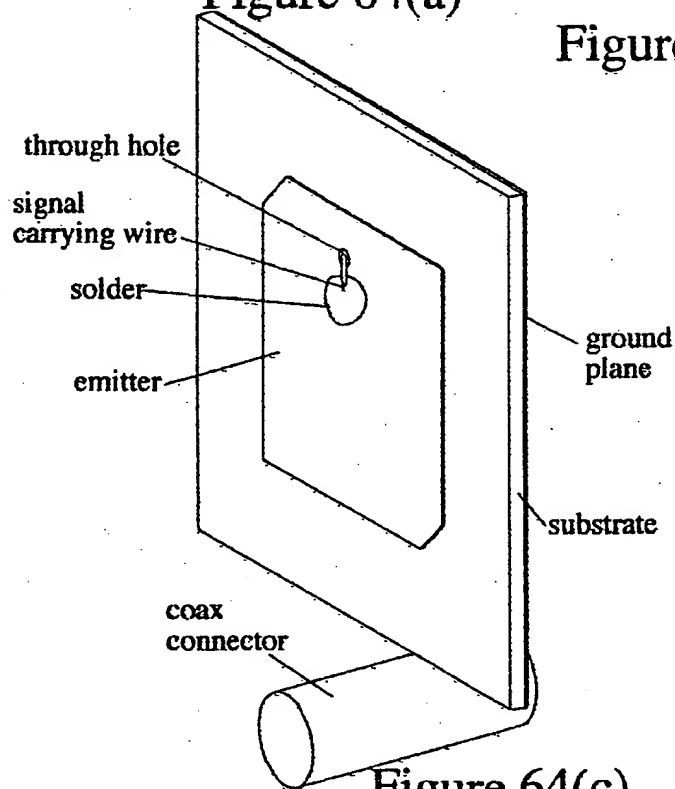


Figure 64(c)

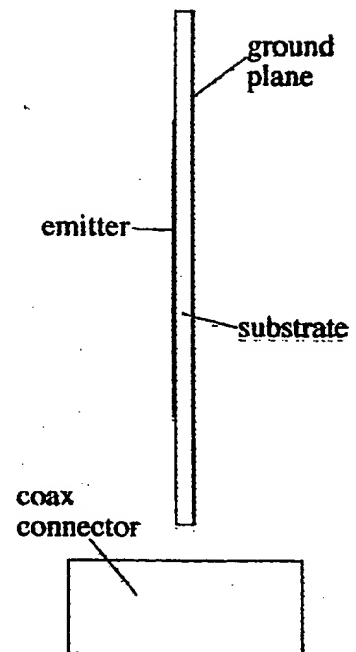


Figure 64(d)

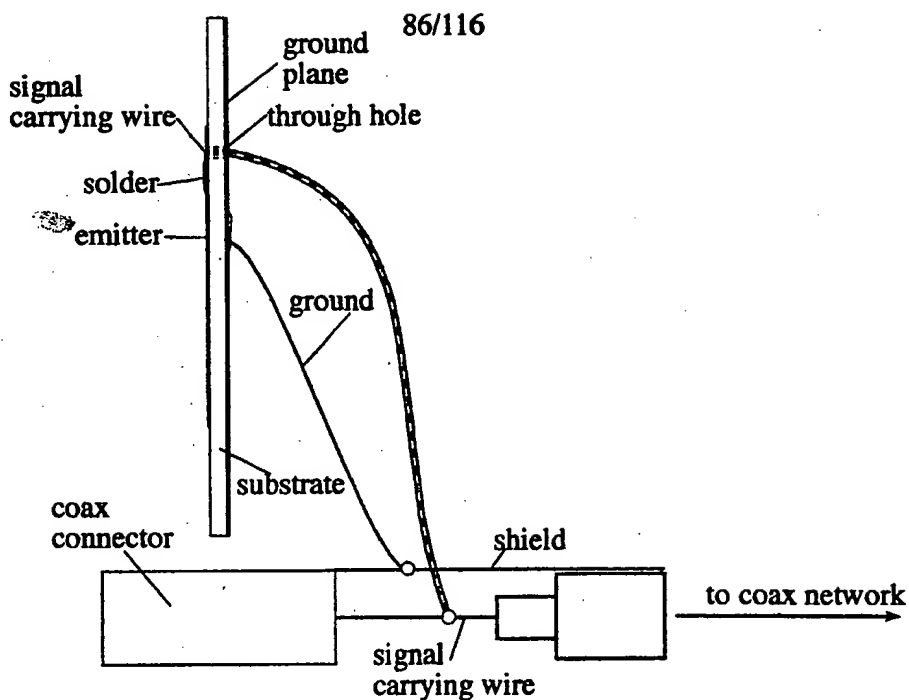
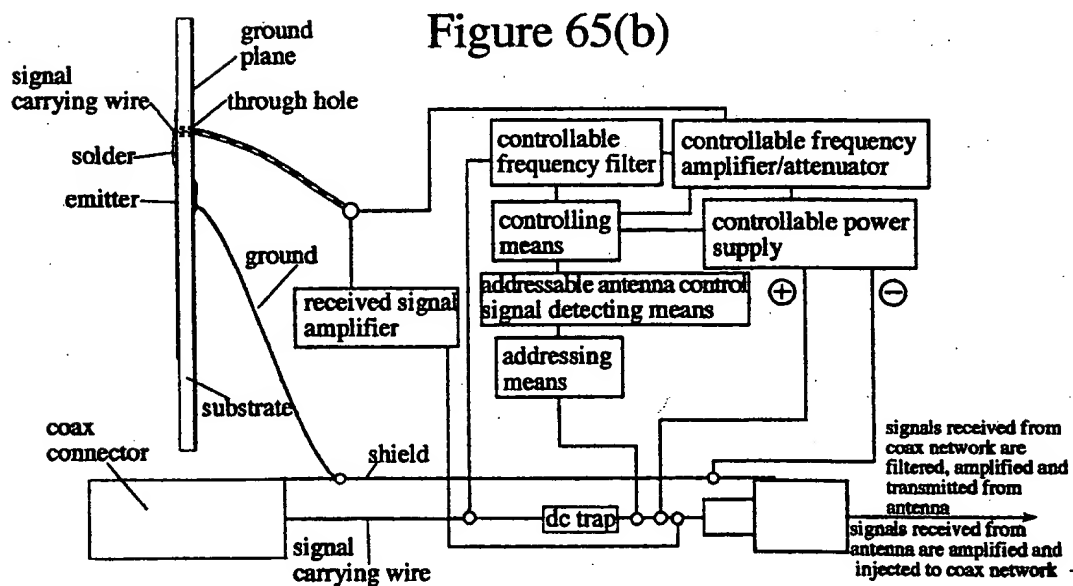


Figure 65(a)



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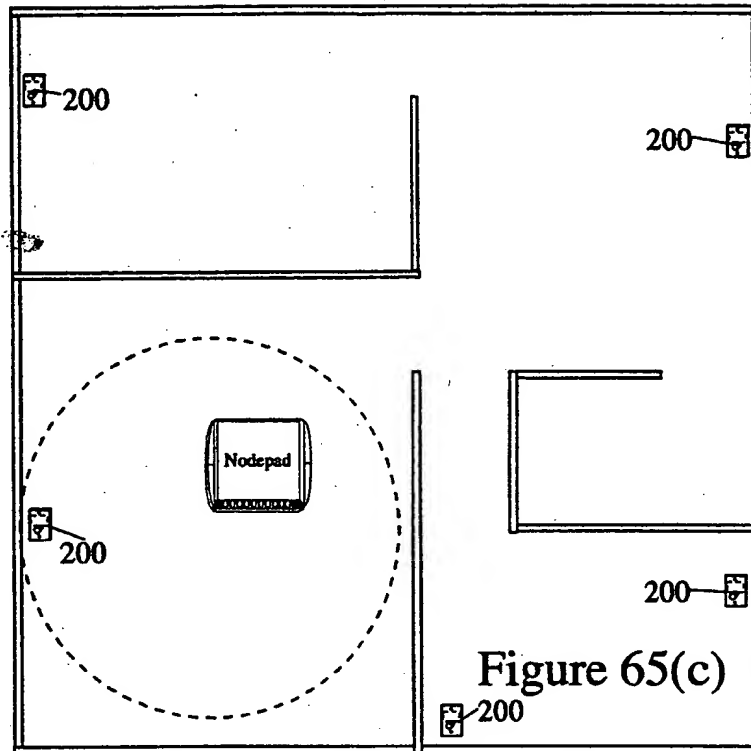


Figure 65(c)

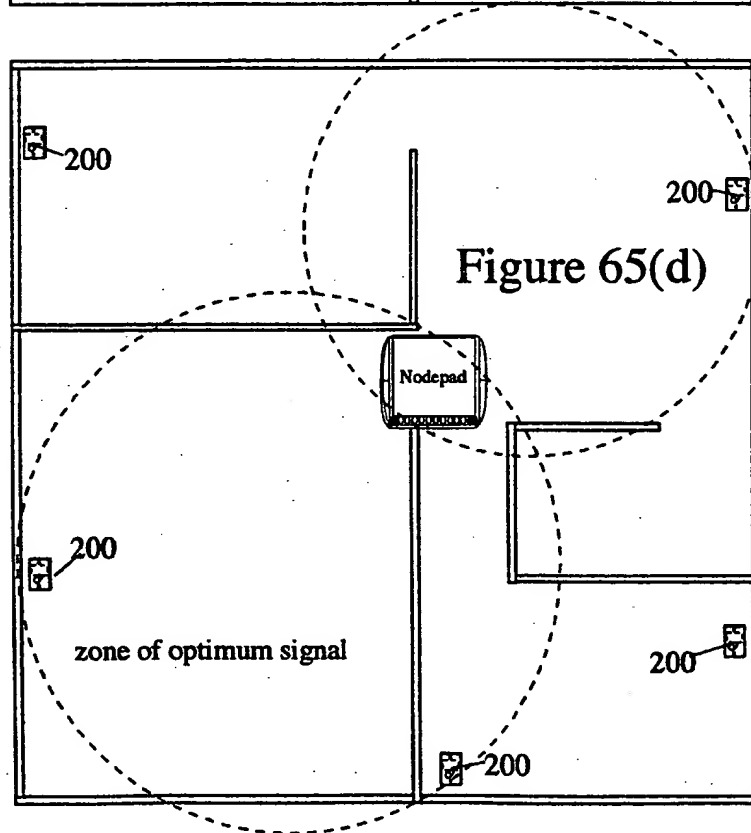


Figure 65(d)

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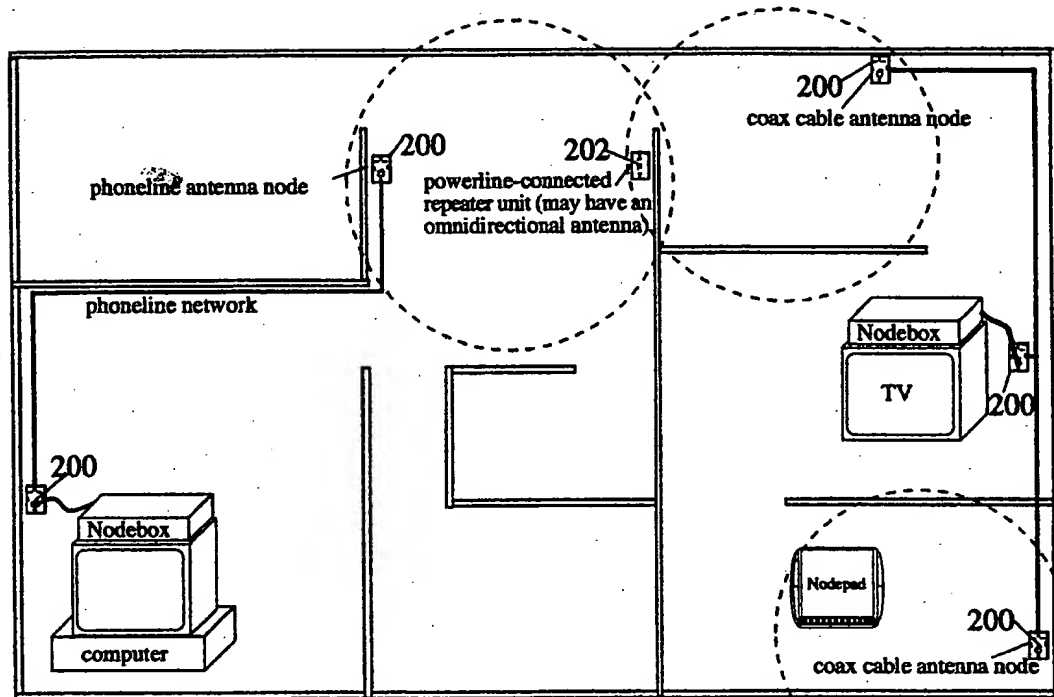


Figure 65(e)

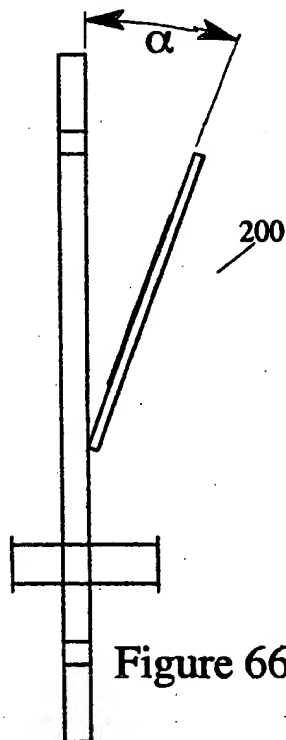


Figure 66(a)

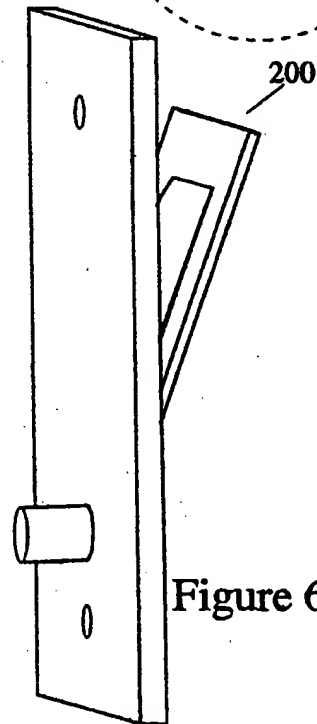


Figure 66(b)



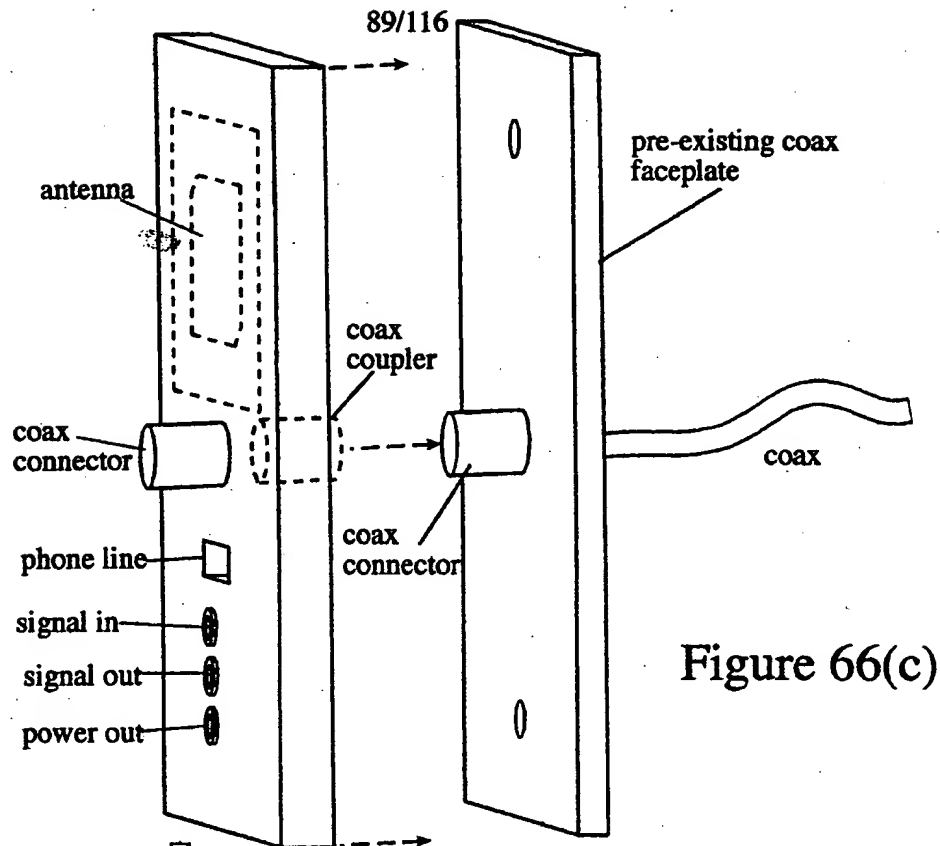


Figure 66(c)

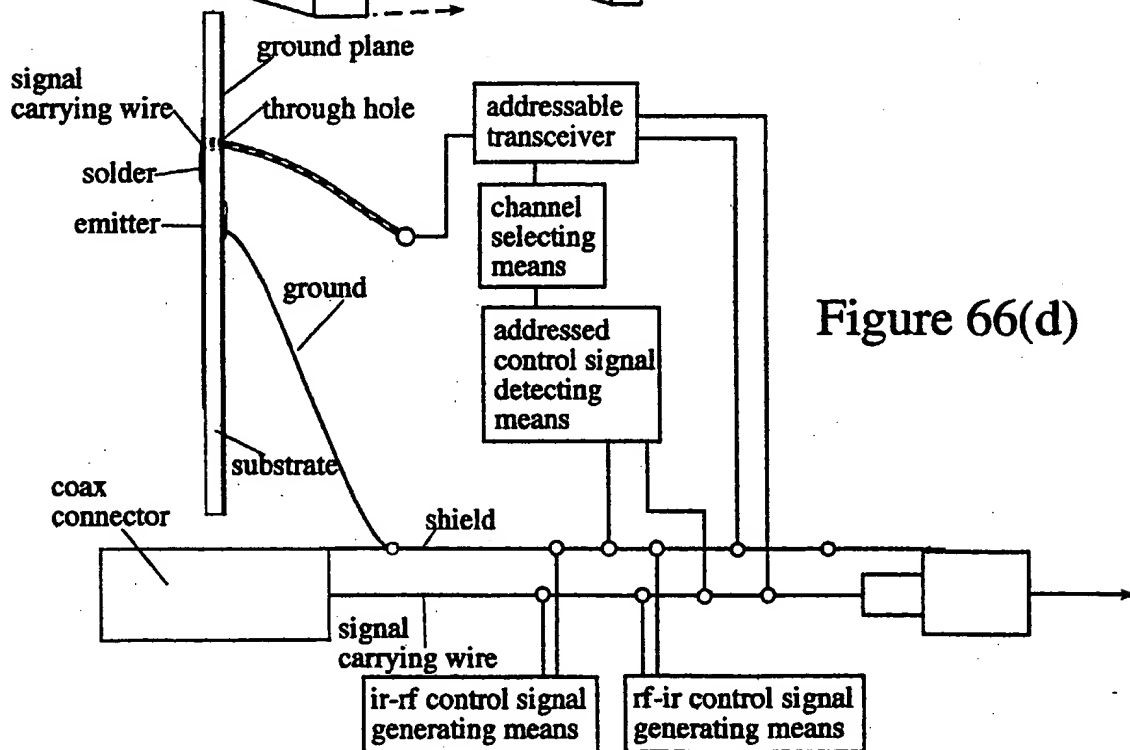


Figure 66(d)

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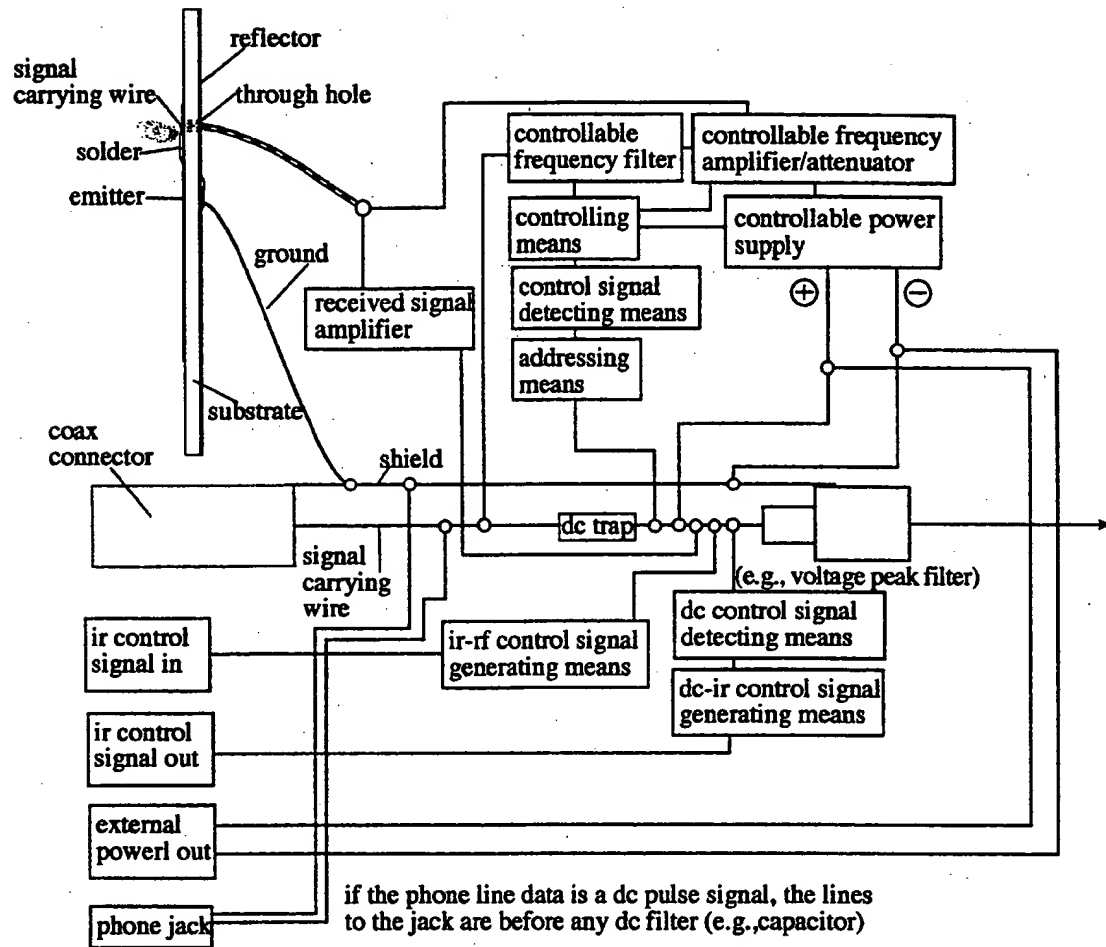


Figure 66(e)

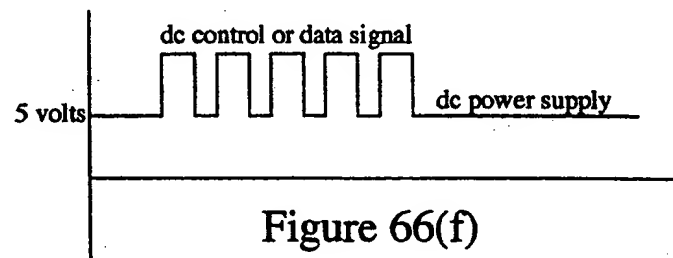


Figure 66(f)

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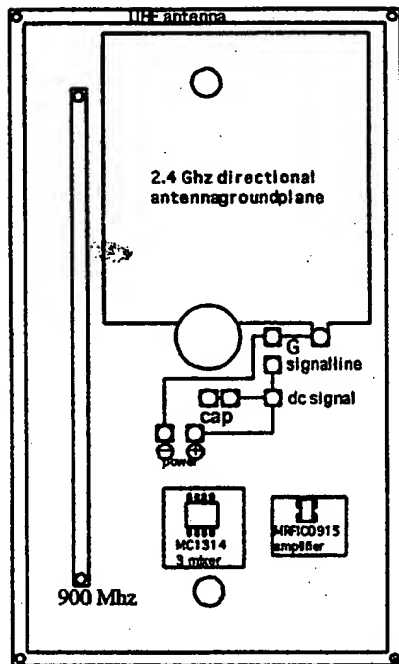


Figure 66(g)

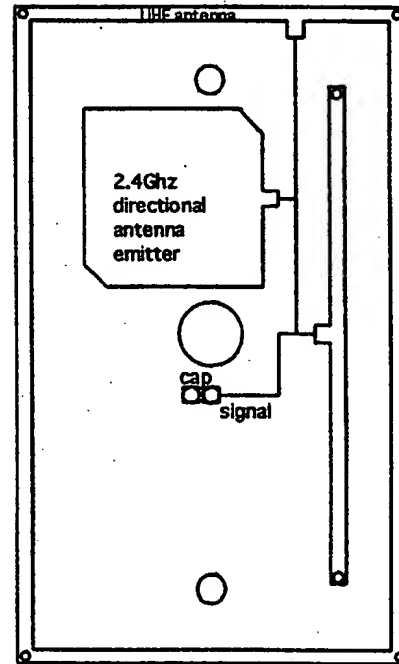


Figure 66(h)

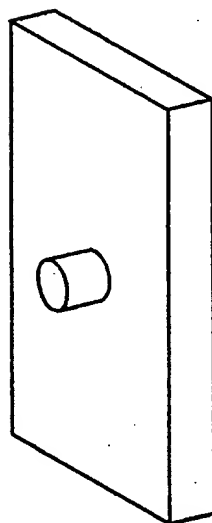


Figure 66(i)

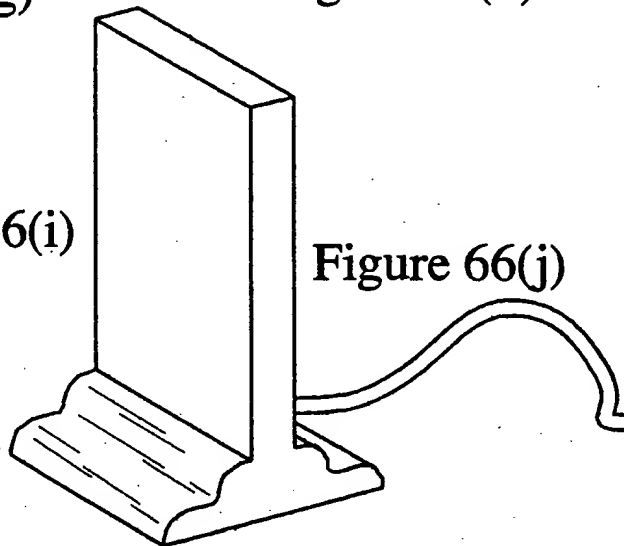


Figure 66(j)

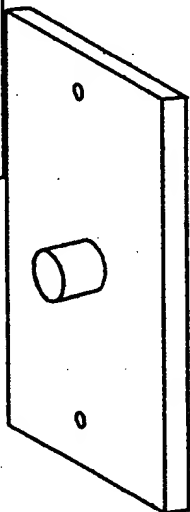


Figure 66(k)

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## Prototype Construction

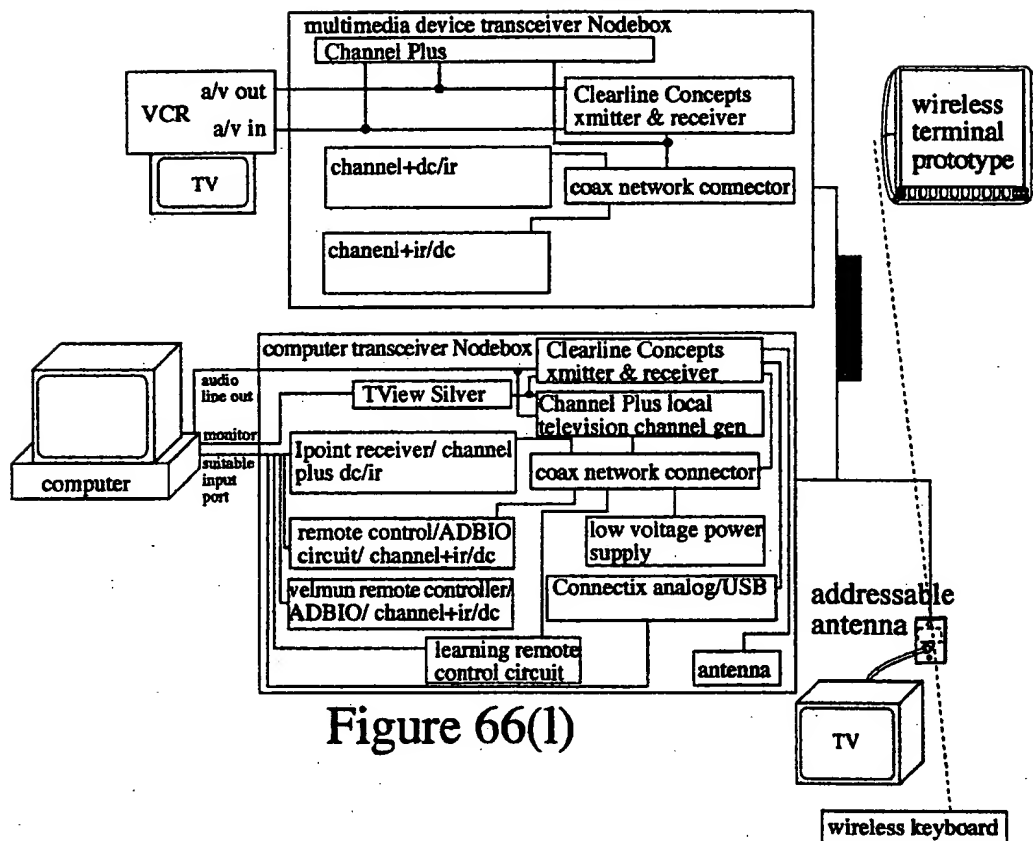


Figure 66(1)

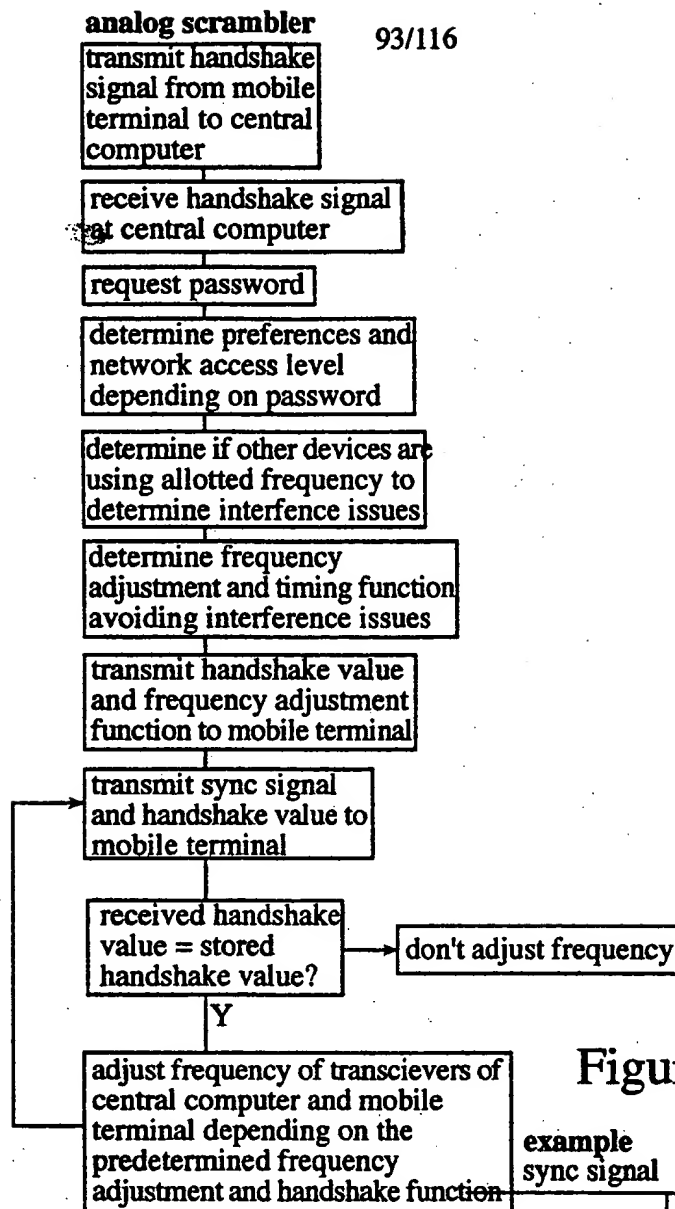


Figure 67(a)

Figure 67(b)

example sync signal	frequency f
1	2.325Ghz
2	2.475Ghz
3	2.210Ghz
4	2.505Ghz
5	2.315Ghz
6	2.400Ghz
N	2.285Ghz

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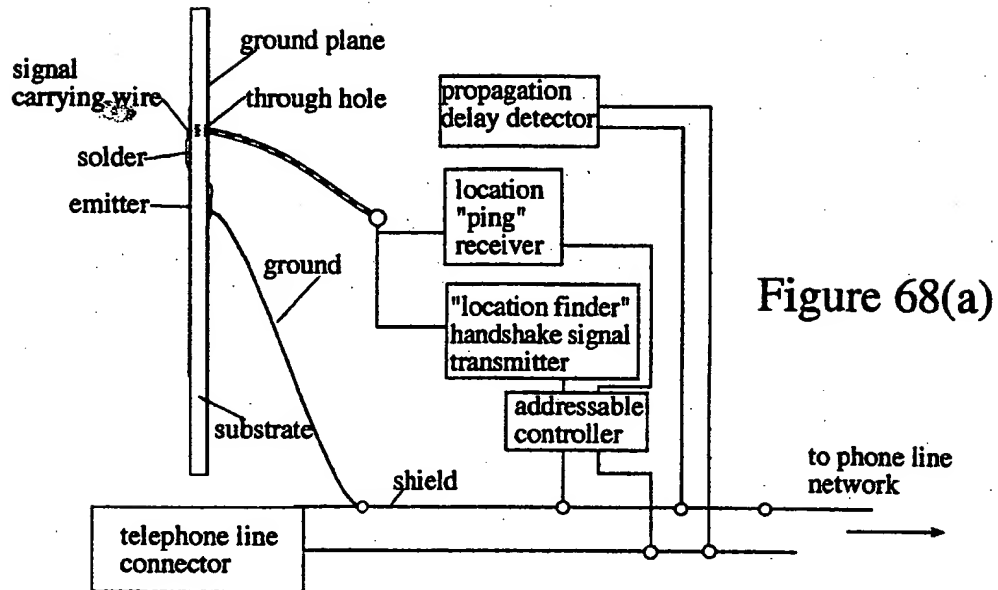


Figure 68(a)

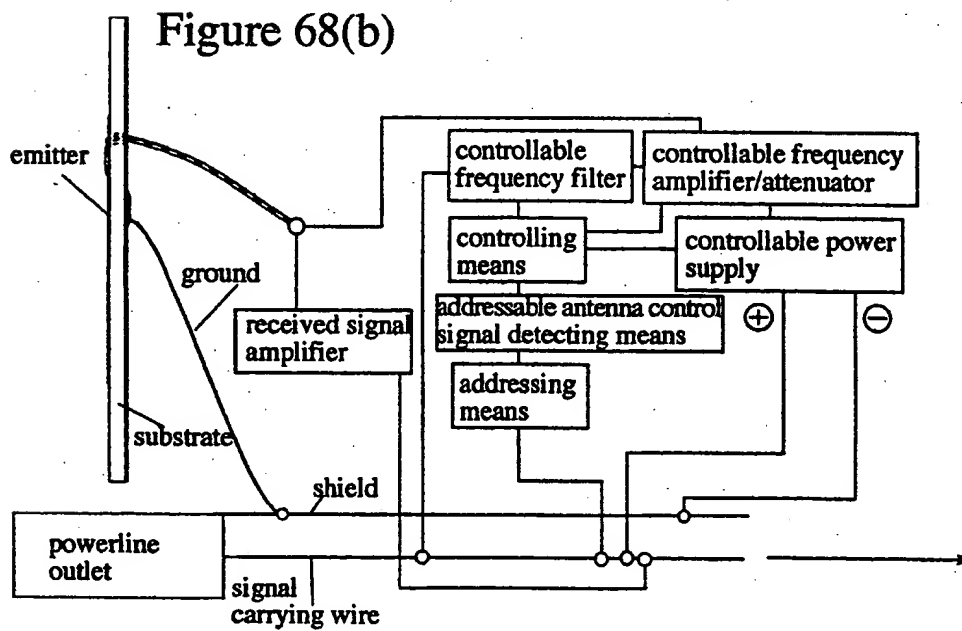


Figure 68(b)

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**Determining the appropriate signal power  
transmitted from antenna nodes to a  
Wireless Device within a network**

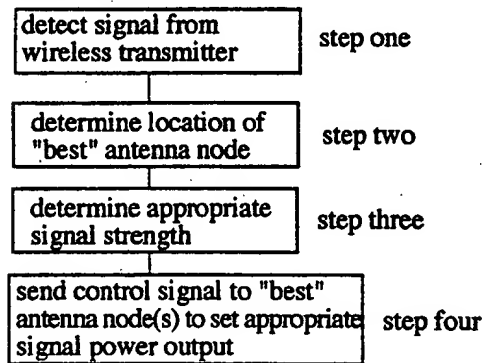


Figure 69(a)

**Determining the location of a  
Wireless Device within a network**

At Central Computer

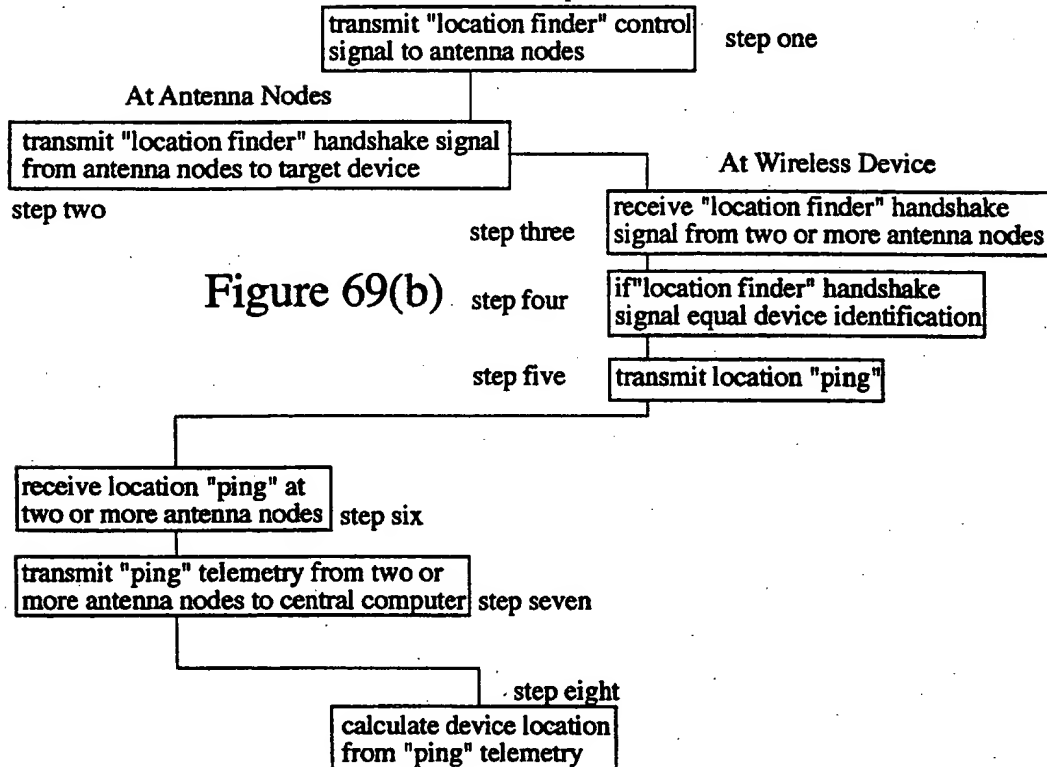


Figure 69(b)

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**Determining the appropriate signal power  
transmitted from antenna nodes to a  
Wireless Device within a network**

At Central Computer

transmit "location finder" control  
signal to antenna nodes

step one

At Antenna Nodes

transmit "location finder" handshake signal  
from antenna nodes to target device

step two

At Wireless Device

receive "location finder" handshake  
signal from two or more antenna nodes

step three

if "location finder" handshake  
signal equal device identification

step four

transmit location "ping"

step five

receive location "ping" at  
two or more antenna nodes

step six

transmit "ping" delay from two or more  
antenna nodes to central computer

step seven

step eight

determine appropriate  
signal strength

step nine

determine appropriate signal  
strength for each antenna node

step ten

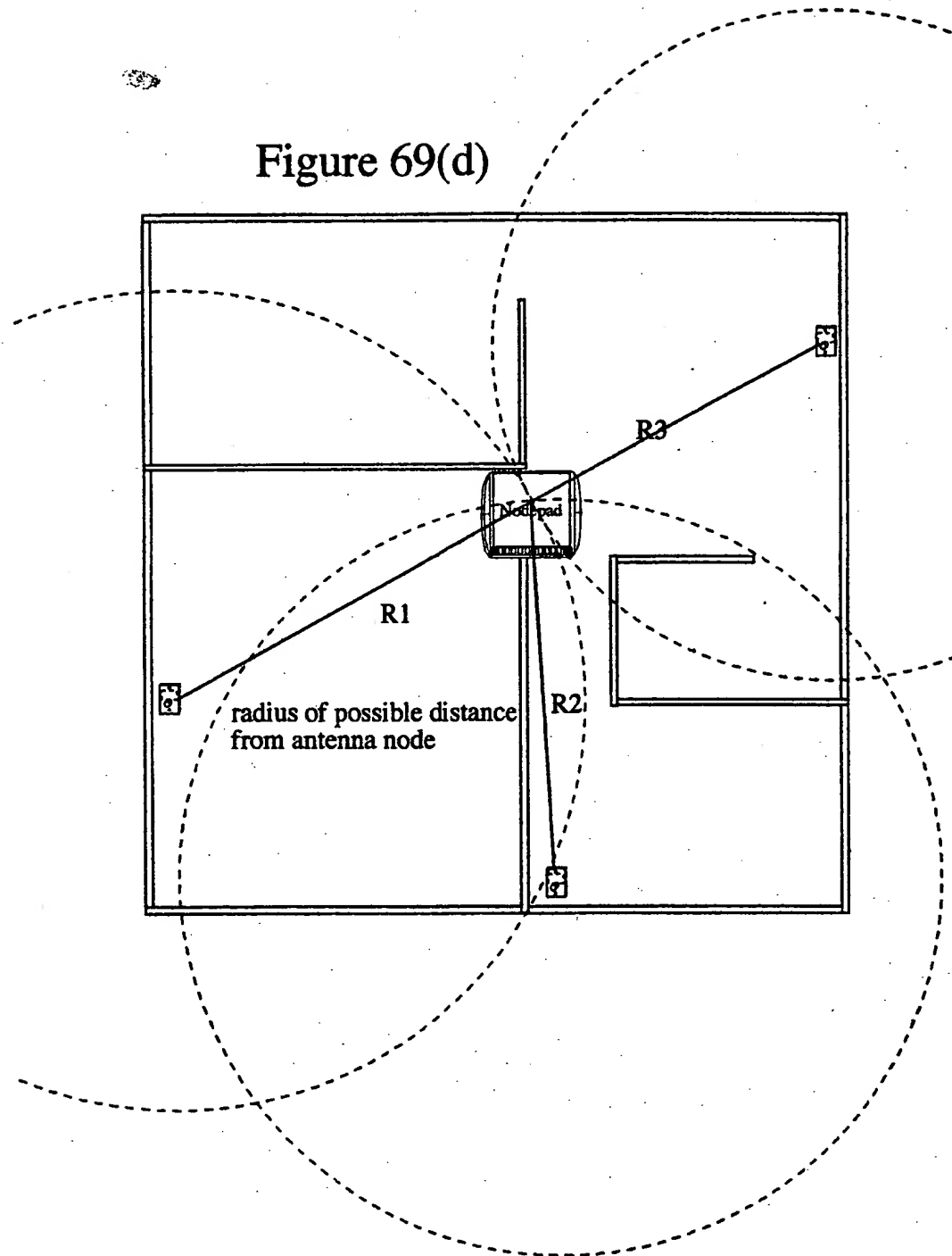
send control signal to antenna  
node to set appropriate signal  
power output

Figure 69(c)



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Figure 69(d)



98/116

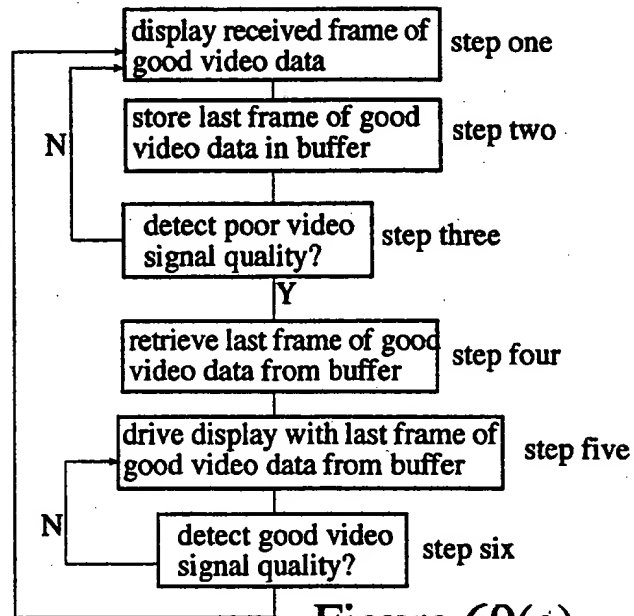
**Using frame buffer to prevent disruption of video signal**

Figure 69(e)

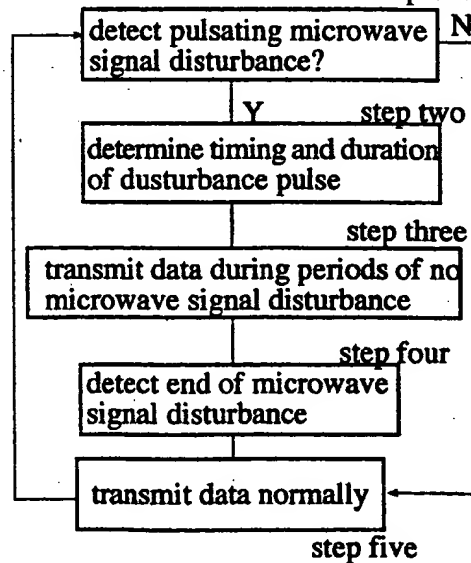
**Compensating for microwave oven interference**

Figure 69(f)

99/116

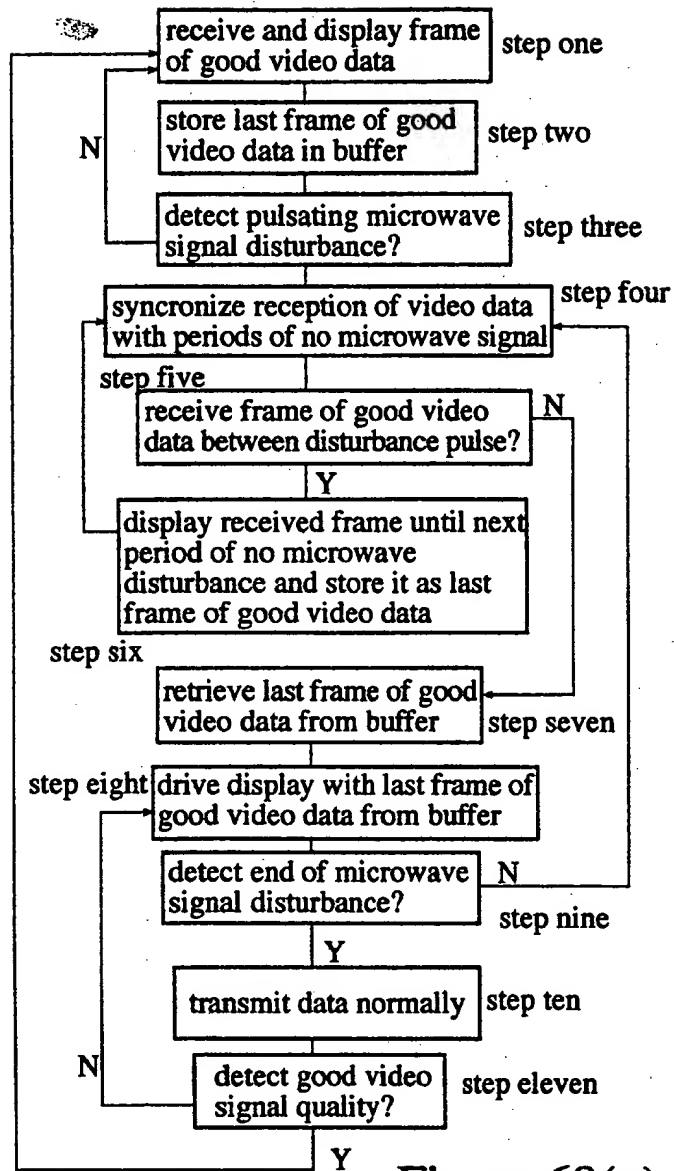
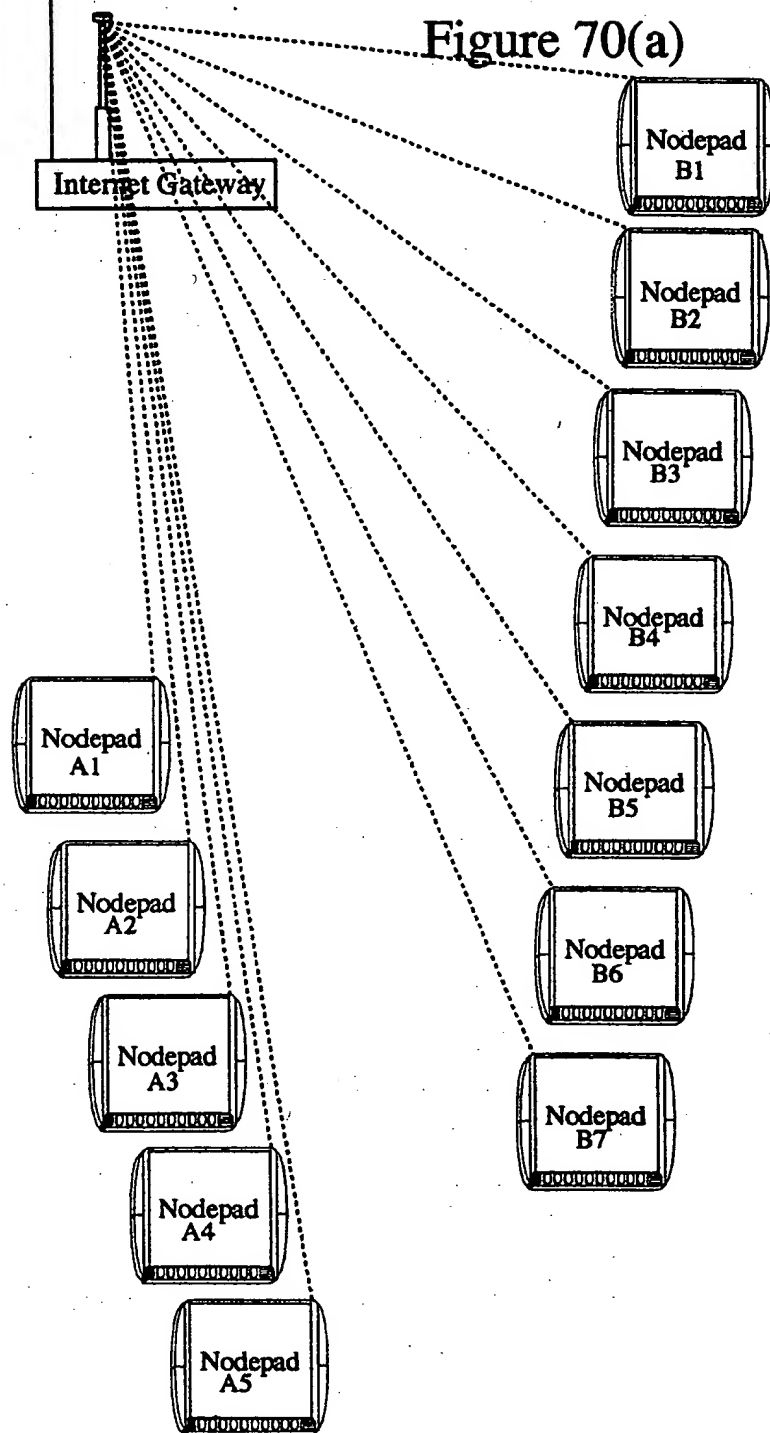


Figure 69(g)

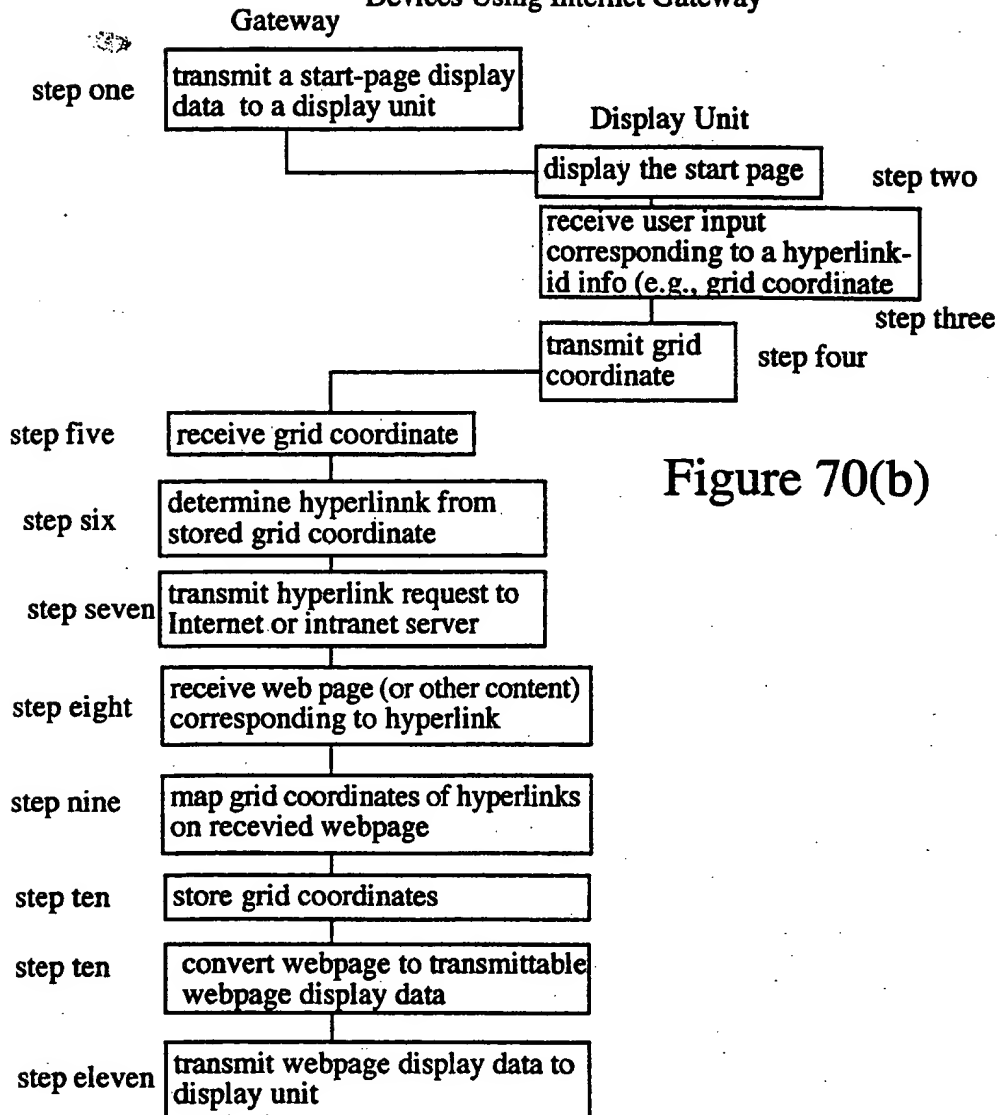
100/116

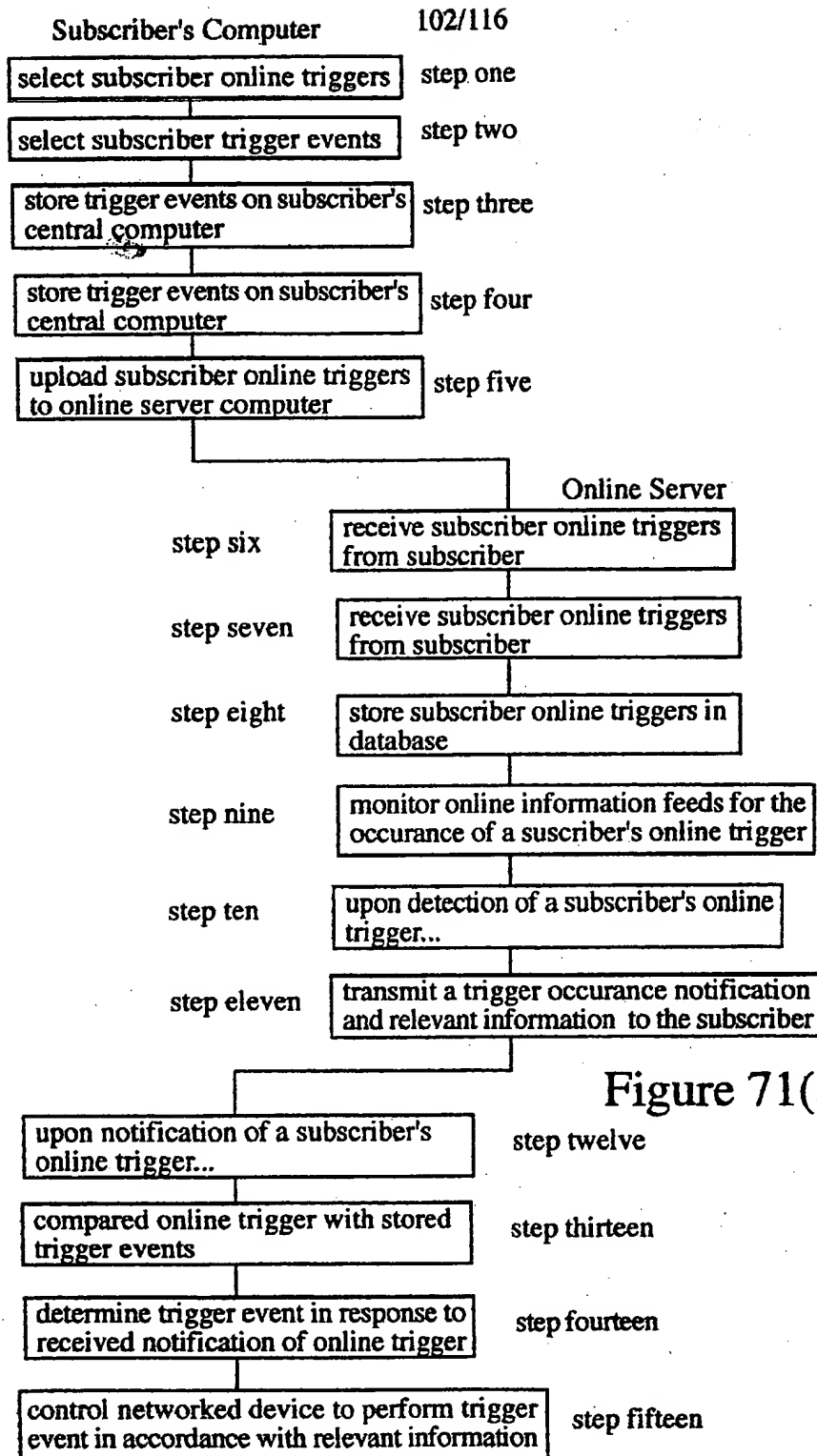
Internet connection

Figure 70(a)



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Web Browsing on Remote Display  
Devices Using Internet Gateway



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select subscriber online triggers

Trigger No:	Trigger Type:	Trigger:	Notification Method:	Online Info. Source:	Recurrence:
1	stock price	Apple Computer at 50	Instant message-type notification	NASDAQ online stock ticker	once, then ask for new price
2	television program	show with John Wayne	email-type notification	Online program guide	month, then check to confirm
3	email	email from partner	Instant message-type notification	subscriber's ISP mail server	always, until reset
4	Internet phone call	phone call from mom	Instant message-type notification	subscriber's Internet phone service	always, until reset
5	weather alert	severe weather imminent in Seymour CT	Instant message-type notification	NOAH online weather service	always

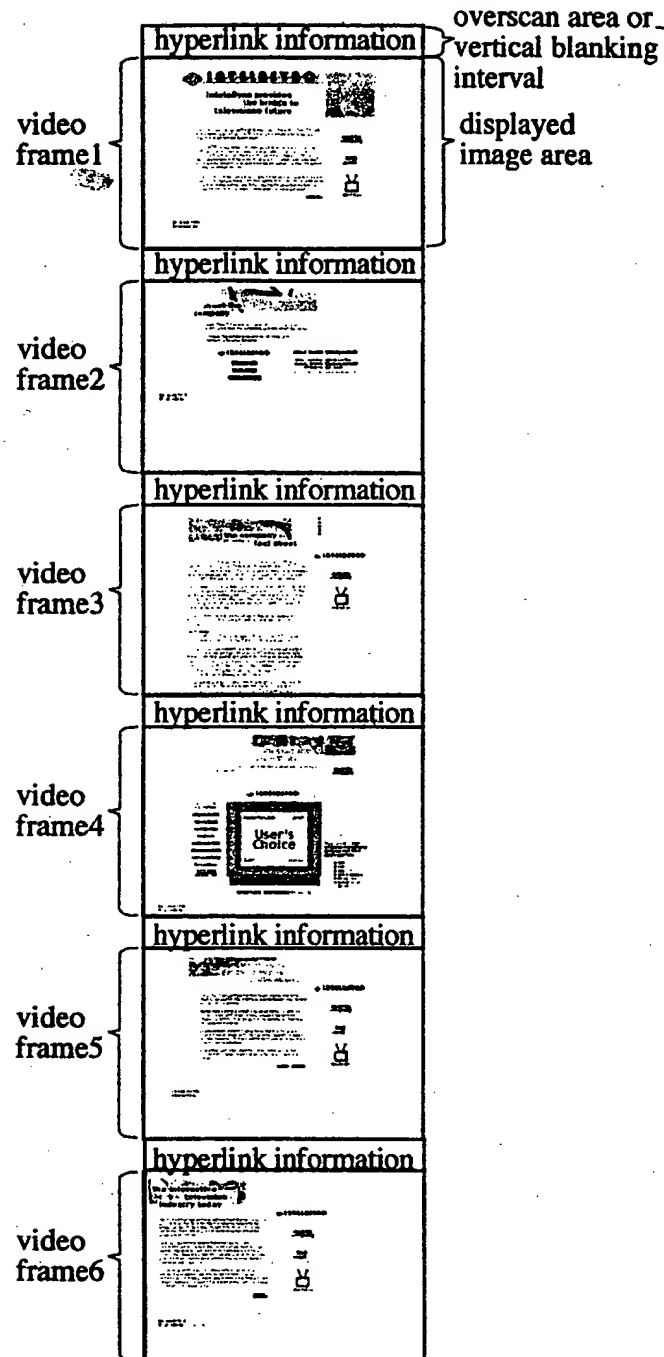
Figure 71(b)

select subscriber trigger events

Trigger No:	Trigger:	Trigger Event
1	Apple Computer at 50	open browser to Yahoo.com; do online news search with keywords ("Apple Computer", stock, price, "earnings report") occurring within one day; open second browser to Etrade.com; put local computer cahnnel in PIP on television in home office; send page to pager with message "Apple at 50";
2	show with John Wayne	get channel, time, duration and date information from email notification; control VCR in bedroom to record show; put show reminder in daily schedule for day show airs and day after recording;
3	email from partner	search email for priority; if priority equals "highest" put email in PIP on all display devices; ring phone with "urgent email" ring; if priority equals "lowest" leave email on ISP mail server
4	phone call from mom	put caller-id notification in PIP on all displays that are on; if called not answered by third ring, roll to cell phone; if call not answer by third cell phone ring, perform answering machine function and record message, send page with message "mom called" + date
5	severe weather imminent in Seymour CT	turn all displays on; turn volume on all display to 3/4; open web page NOAH.com/newhaven.ct/; open computer TV application; tune computer TV tuner to weather channel; compose weather channel and browser to split screen; switch all displays to local television program

Figure 71(c)

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six pages of a website  
transferred as video  
data - NTCS video  
frame rate is 33  
frames/second. Six  
page website can be  
transferred in about  
2/10ths of a second

Figure 72(a)



[illegible]

Figure 72(b)

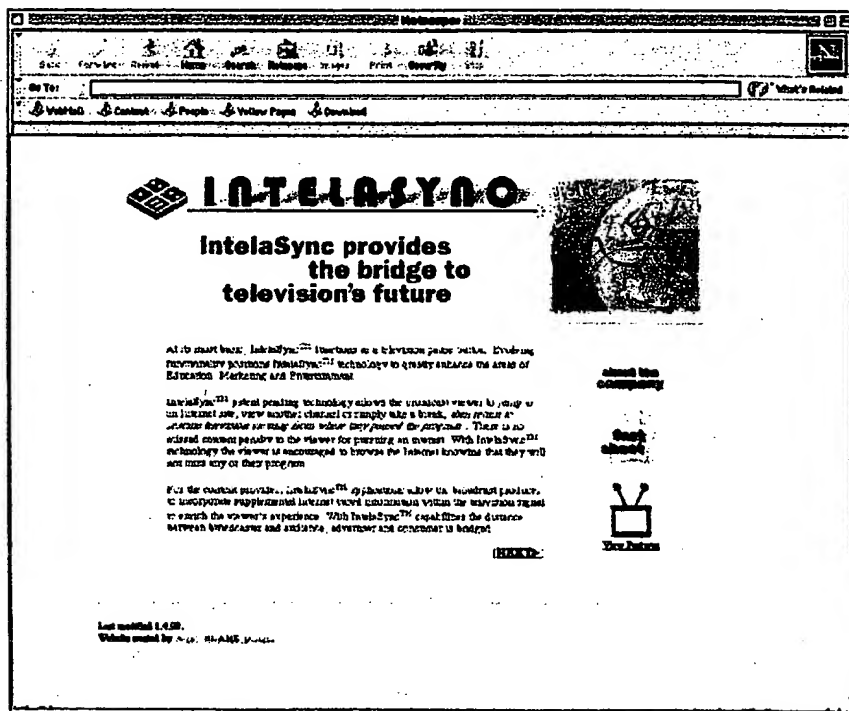




Figure 72(c)

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Page Data:			
Page Title:	page location: videoA1 frame1		
Link Data:			
Link Title:	image location:	linked to:	operation:
about them company	486,324;509,356	videoA1 frame2	goto linked page
fact sheet	398,376;550,431	videoA1 frame3	goto linked page
view features	498,444;547,521	videoA1 frame4	goto linked page
next	385,513;436,526	videoA1 frame5	goto linked page
pointblank design	169,603;276,619	nycs8@aol.com	open new email; connect to WWW


**INTELASYNC**


**IntelASync provides  
the bridge to  
television's future**

At its most basic, IntelASync™ functions as a television pause button. Evolving functionality positions IntelASync™ technology to greatly enhance the areas of Education, Marketing and Entertainment.

IntelASync™ patent pending technology allows the broadcast viewer to jump to an Internet site, view another channel or simply take a break. *then return at resume television viewing from where they paused the program.* There is no missed content penalty to the viewer for pursuing an interest. With IntelASync™ technology the viewer is encouraged to browse the Internet knowing that they will not miss any of their program.

For the content provider, IntelASync™ applications allow the broadcast producer to incorporate supplemental Internet based information within the television signal to enrich the viewer's experience. With IntelASync™ capabilities the distance between broadcaster and audience, advertiser and consumer is bridged.

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Last modified 1-4-99  
Video saved by **POINT BLANK**

Figure 72(d)

107/116

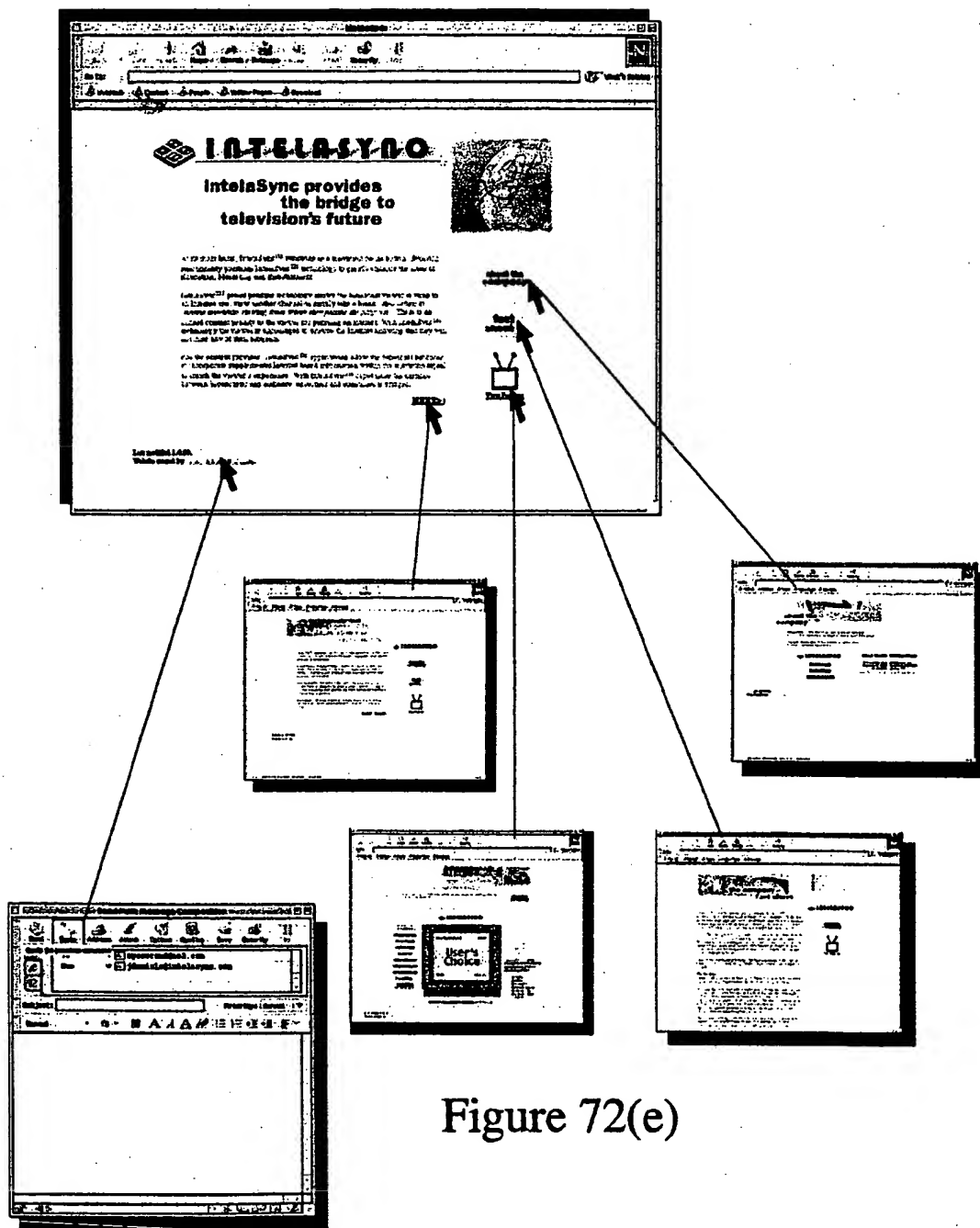


Figure 72(e)

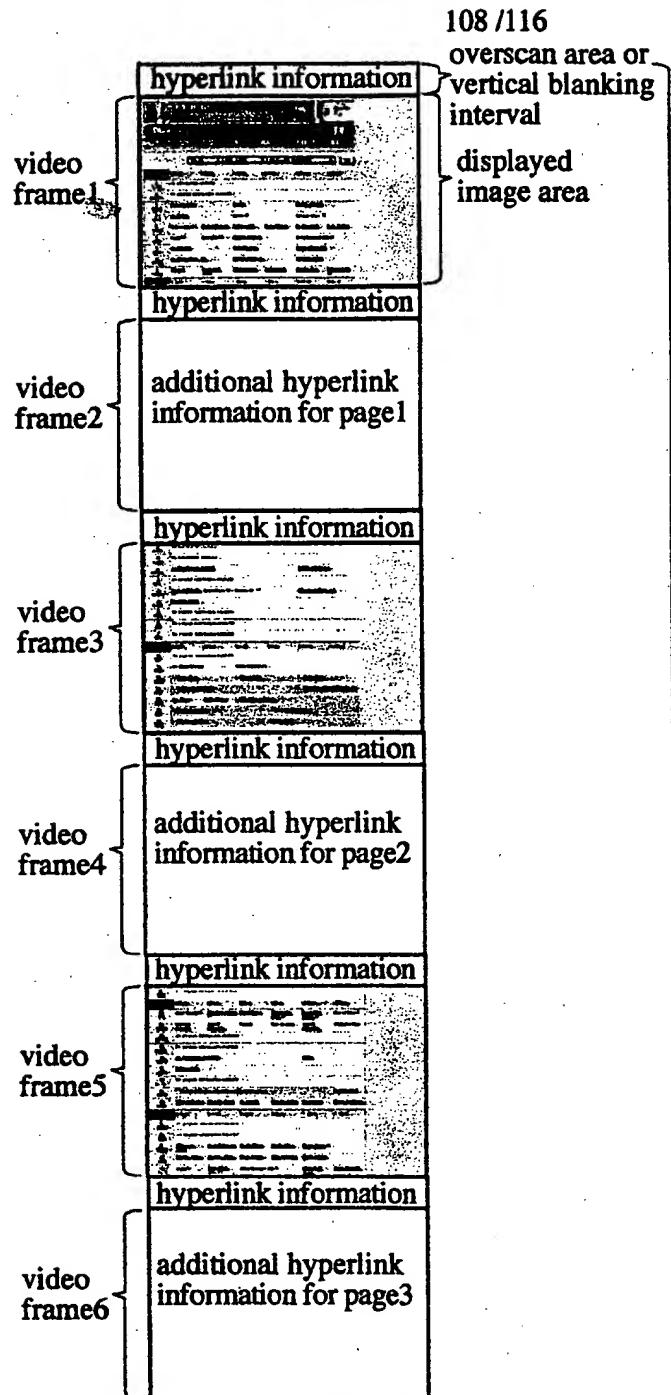


Figure 72(f)

109 /116

Page Data:			
Page Title:	page location:	pagereception:	
entripage	videoA1 frame1	213250701151999	
Link Data:			
Page Element Title:	image location:	Element Order:	Element Type:
IntelaSync Logo	78,123;121,186	1	graphic
IntelaSync Text	150,32;121,186	2	graphic
Globe Graphic	512,137;662,271	3	graphic
Page Description	150,195;437,262	4	text
Company Description	118,301;513,504	5	text
Webmaster	86,597;172,612	6	text
Link Data:			
Link Title:	image location:	linked to:	operation:
about them company	486,324;509,356	videoA1 frame2	goto linked page
fact sheet	398,376;550,431	videoA1 frame3	goto linked page
view features	498,444;547,521	videoA1 frame4	goto linked page
next	385,513;436,526	videoA1 frame5	goto linked page
about the company	169,603;276,619	nycs8@aol.com	open new email; connect to WWW

150,32 512,137

78,123 121,186 150,195

**INTELASYNC**

**IntelaSync provides the bridge to television's future**

507, 182

437,262

118,301

At its most basic, IntelaSync™ functions as a television pause button. Evolving functionality positions IntelaSync™ technology to greatly enhance the areas of Education, Marketing and Entertainment.

IntelaSync™ patent pending technology allows the broadcast viewer to jump to an Internet site, view another channel or simply take a break, then return to resume television viewing when resume they resume the program. There is no missed content penalty to the viewer for pausing an Internet. With IntelaSync™ technology the viewer is encouraged to browse the Internet knowing that they will not miss any of their programs.

For the content provider, IntelaSync™ applications allow the broadcast producer to incorporate supplemental Internet based information within the television signal to match the viewer's experience. With IntelaSync™ capabilities the distance between broadcaster and audience, advertiser and consumer is bridged.

86,597 169,603 276,619 172,612

486,324 509,356 398,376 550,431 498,444 547,521 513,504 504 526 436,526

662,271

IntelaSync

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Figure 72(g)

110/116

0010111011011000010101101010001111 binary value  
 screen pixels

illustration of sending binary video data stream -  
 using just the on-off state of the individual pixels

Figure 72(h)

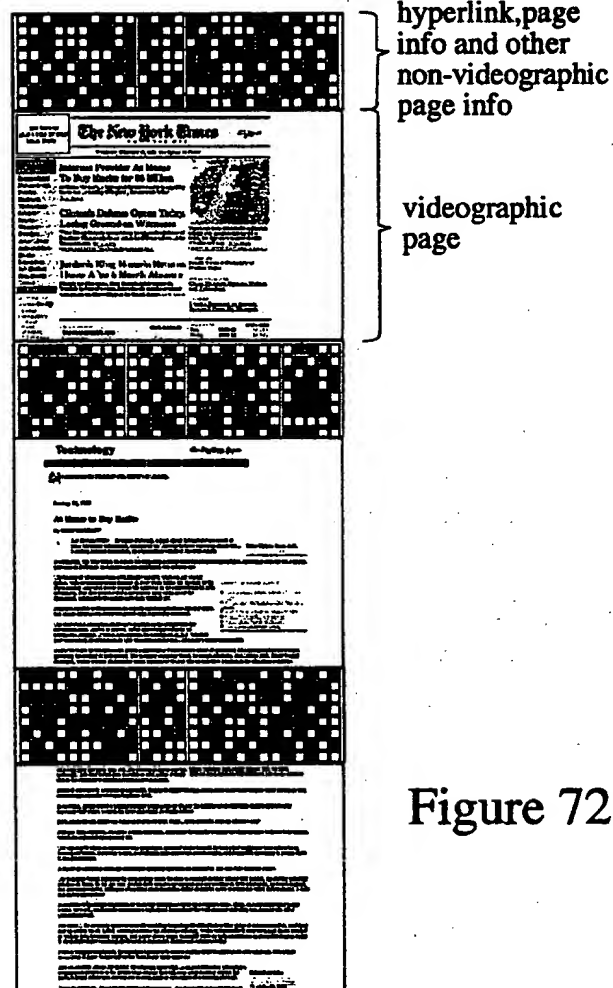
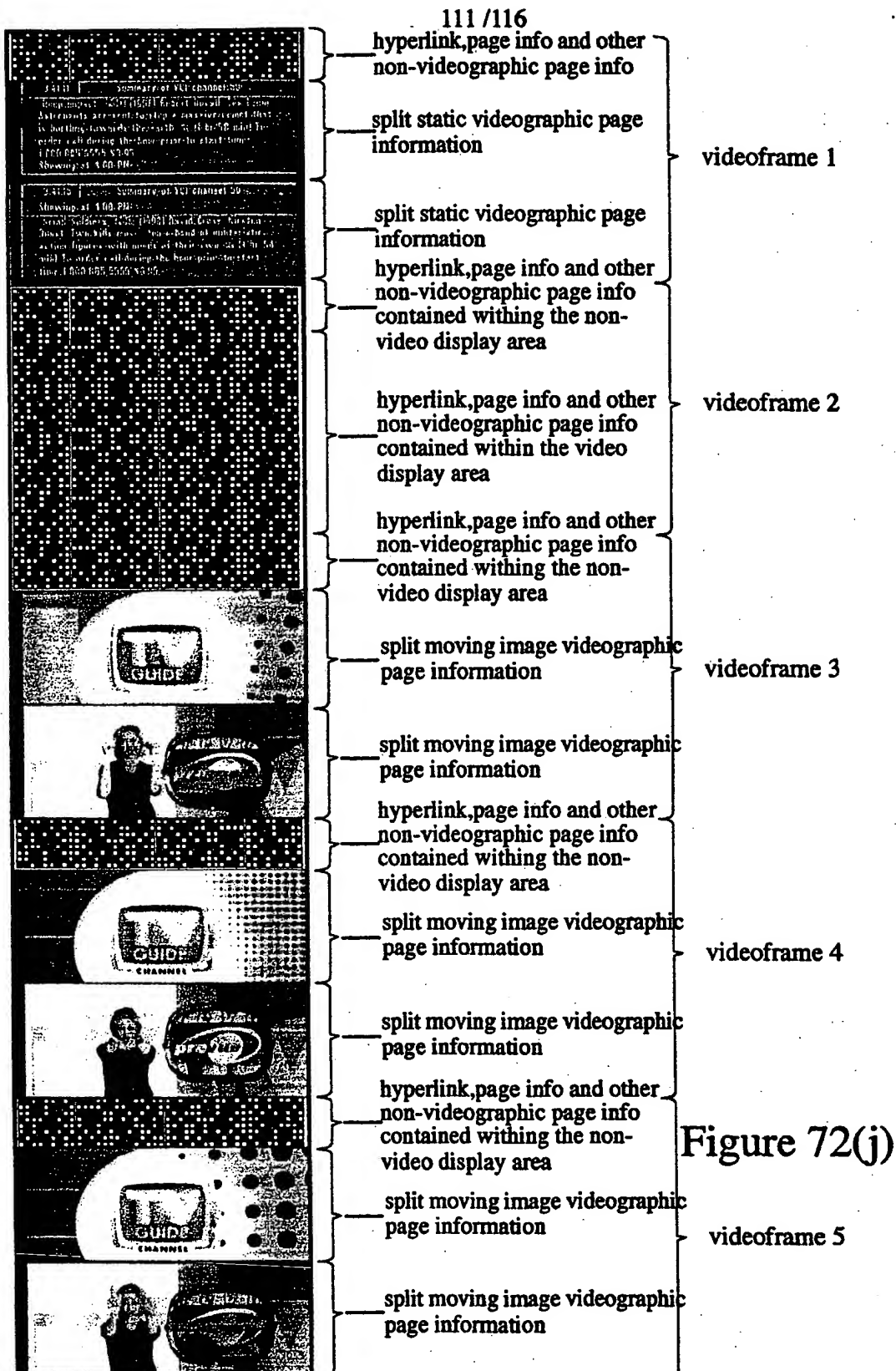


Figure 72(i)



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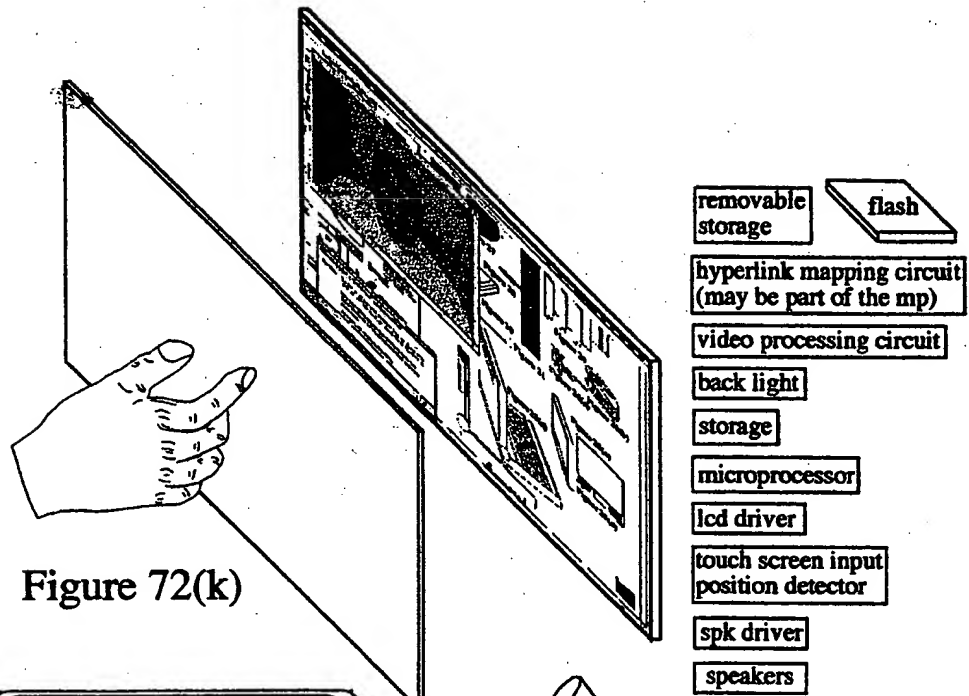


Figure 72(k)

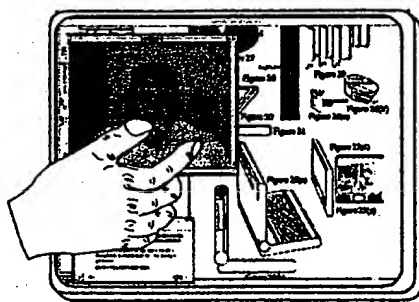
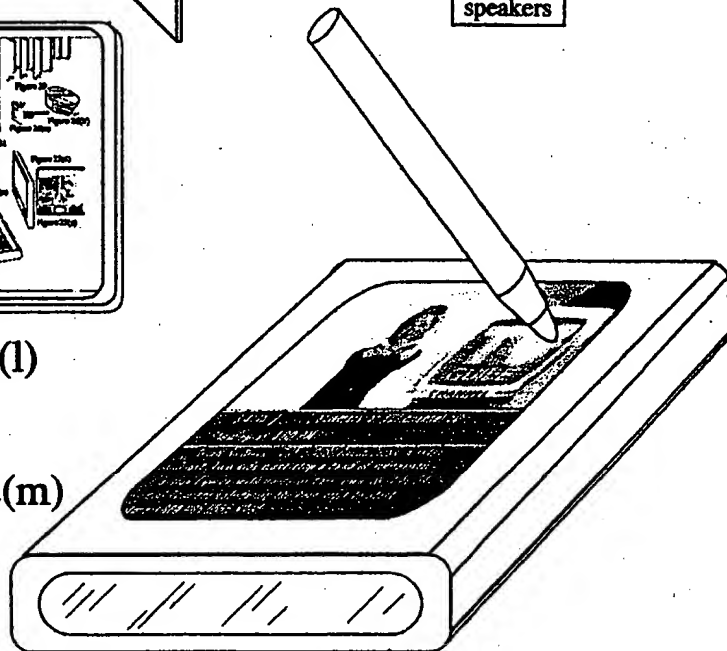


Figure 72(l)

Figure 72(m)





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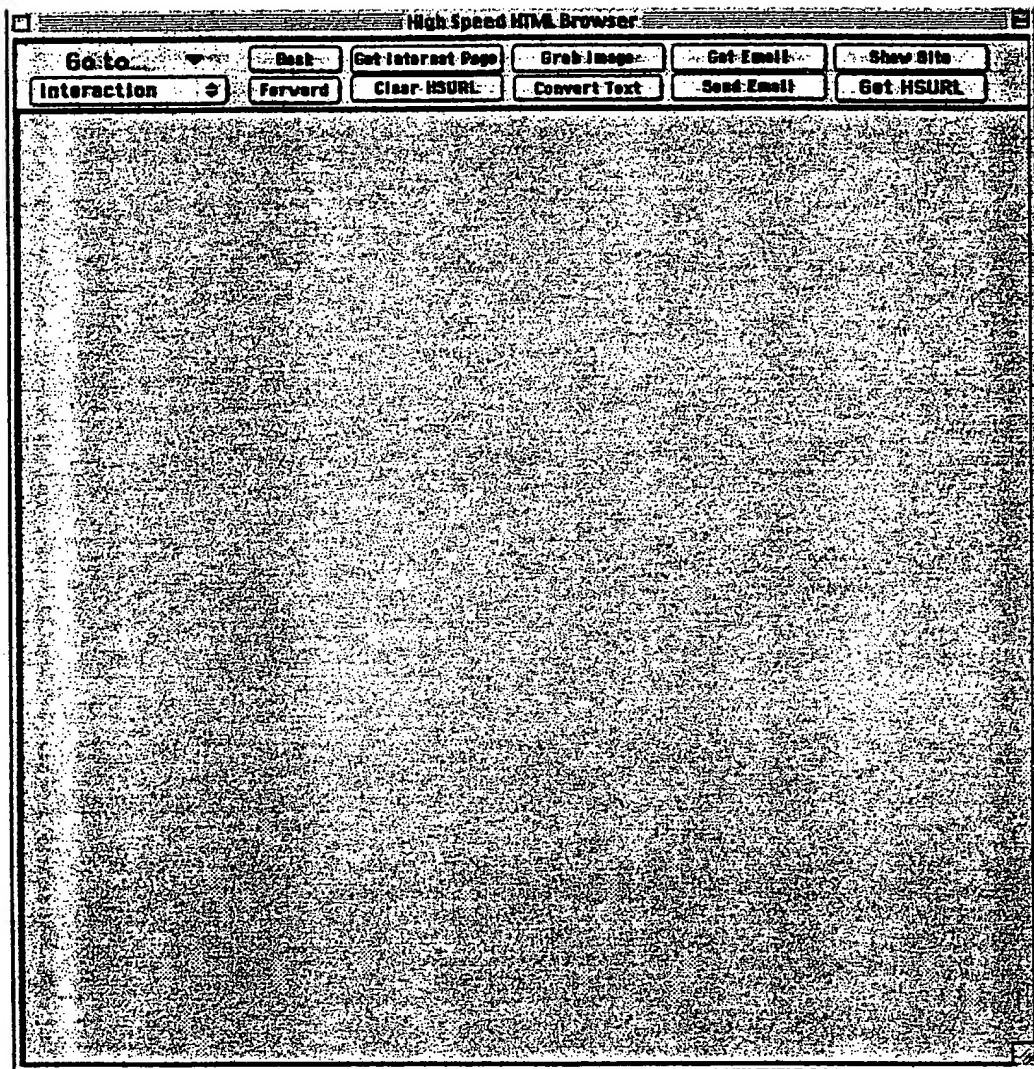


Figure 72(n)

114/116

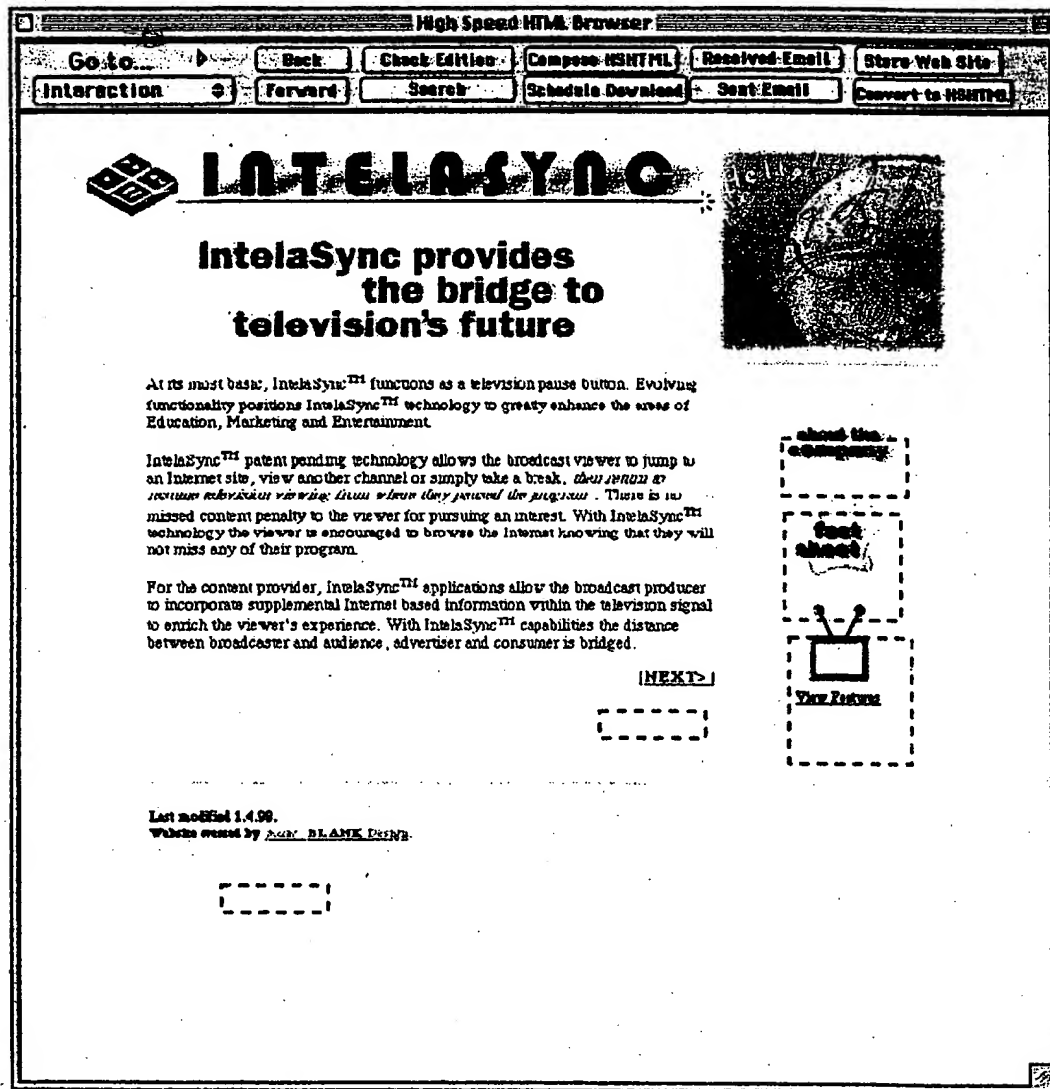


Figure 72(o)

115/116

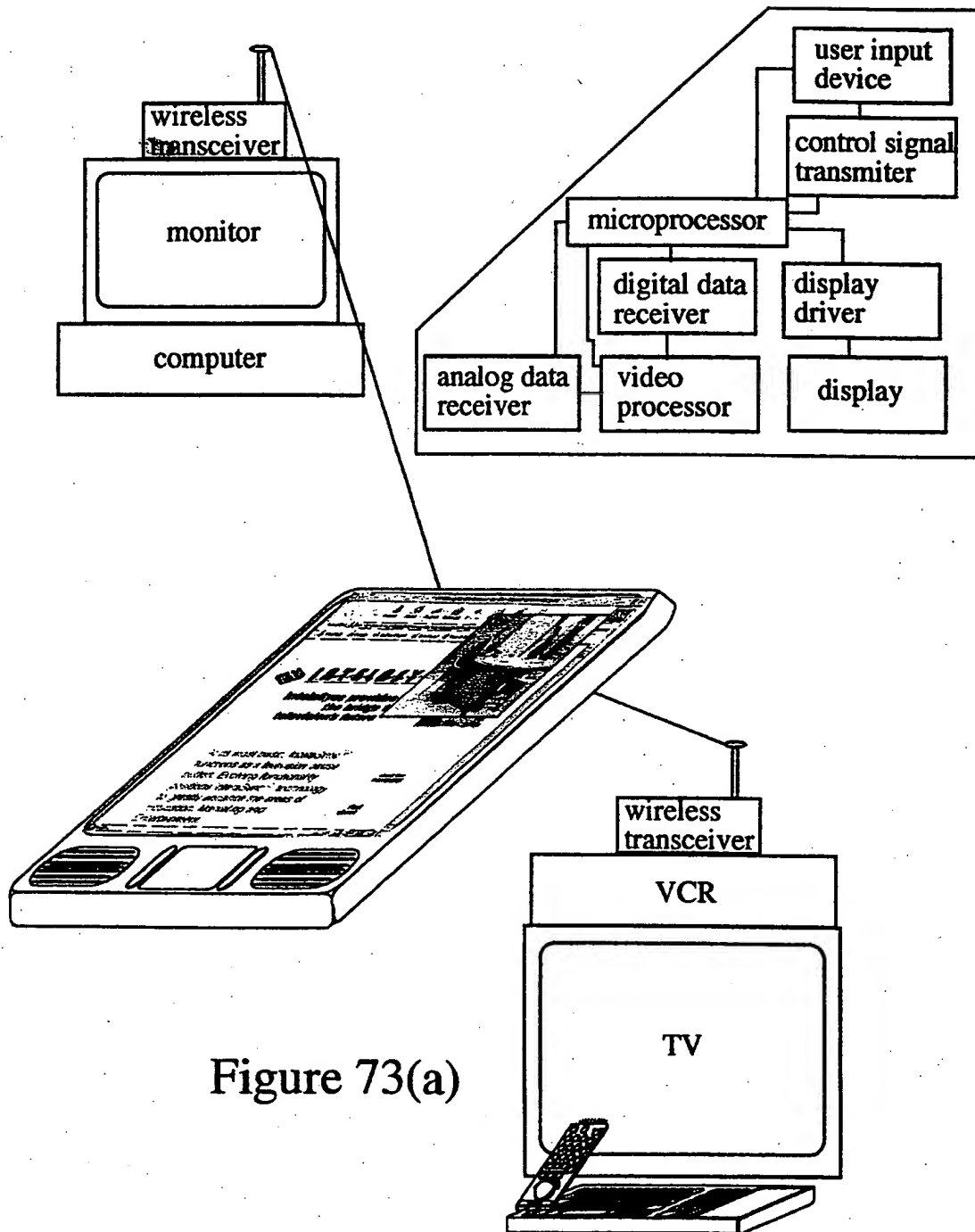


Figure 73(a)

116/116

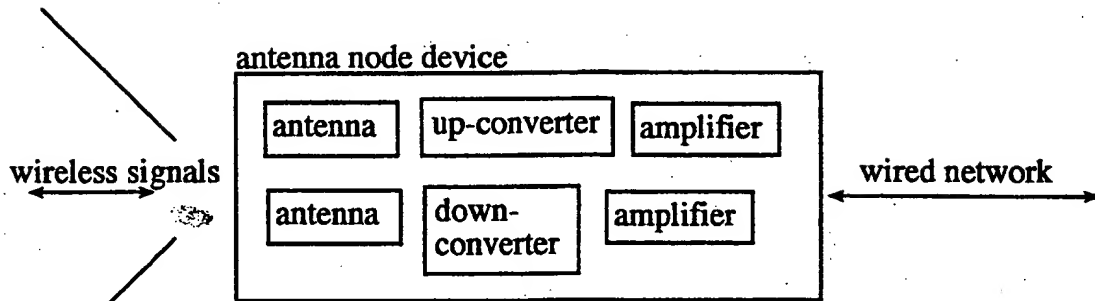


Figure 73(b)

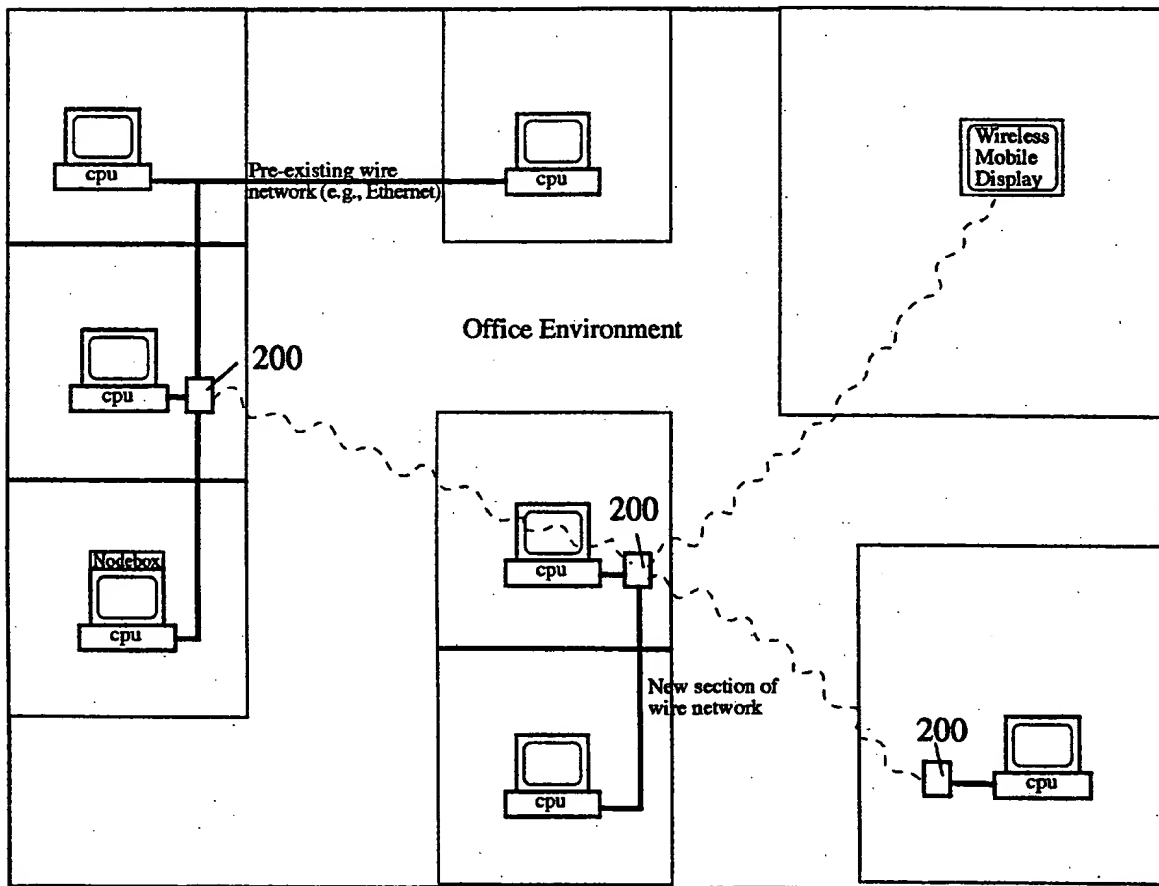


Figure 73(c)

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